AMERICAN MACHINIST

th ANNUAL BUYERS REFERENCE NUMBER

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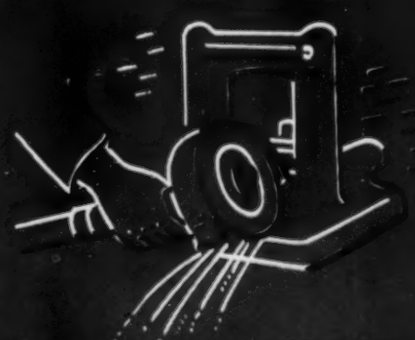
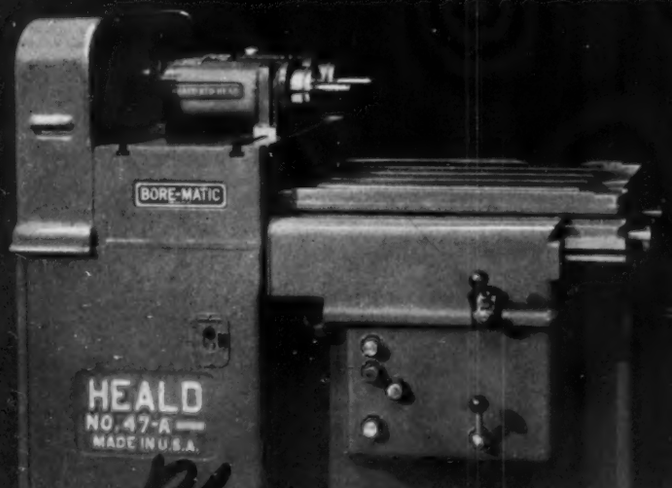


Heald
DESIGNED ATTACHMENTS



Plus YOUR HEALD Bore-Matic Will Handle *All Kinds* of Precision Finishing Jobs

A combination of Heald Bore-Matic plus Heald designed fixture, tooling, and attachments provides means of handling practically every conceivable precision finishing job . . . not just precision boring but precision turning, facing, chamfering and grooving, too, either separately or in combination as multiple operations. To meet your requirements such a combination might include Bore-Matics equipped with universal fixtures for tool room or small lots . . . hand operated cross-slides for hand indexing between operations . . . hydraulically operated cross-slides for facing and automatic indexing . . . special tooling arrangements for finishing ordinarily difficult-to-machine surfaces . . . or special fixtures that speed up production. Whatever the arrangement recommended, every suggestion is based on years of practical experience in designing tooling and fixtures to exactly match Bore-Matic performance . . . and that means maximum precision on your job. Let us go over your problem with you.

UNIVERSAL BORING FIXTURES

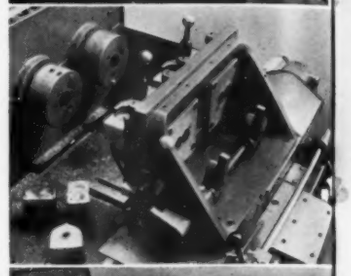
This attachment provides the means of accurately indexing horizontally, vertically and angularly. You can borize multiple surfaces with "jig borer" precision this way.

HAND OPERATED CROSS-SLIDES

Such a cross-slide permits indexing between a series of holes as illustrated, or for quick alignment of fixtures on small lot jobs.

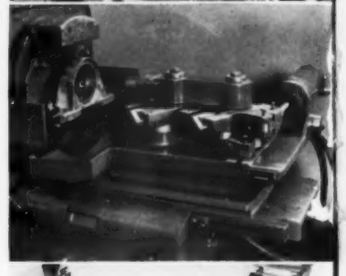
HYDRAULIC CROSS-SLIDES

Hydraulic cross-slides have a variety of useful applications. Their cross movement can be employed for facing operations as shown, for grooving or chamfering, or for indexing.



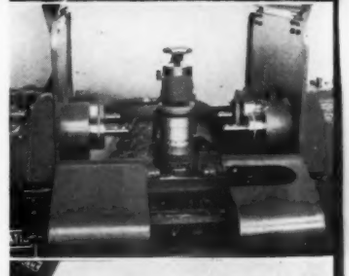
SPHERICAL BORING ATTACHMENTS

These attachments can be used for boring internal spherical surfaces as illustrated, or for turning external spherical surfaces. They provide accurate means of doing a difficult job.



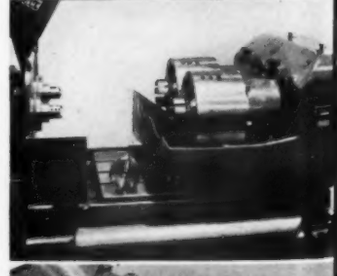
ROTATING TOOL SLIDES

Boring heads on Bore-Matics can be furnished with hydraulically operated tool slides which feed the tool radially while rotating. Very useful for grooving, piston slotting job shown is apt illustration, or for other undercutting work.



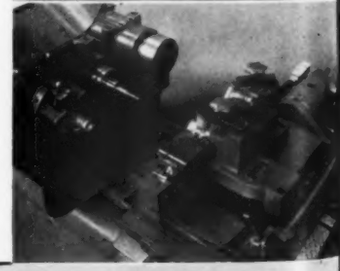
SPECIAL FIXTURES

Heald engineers have designed thousands of fixtures ranging from simple ones to very intricate types. Fixture shown indexes automatically for turning nine teeth on each part.



MULTIPLE OPERATIONS

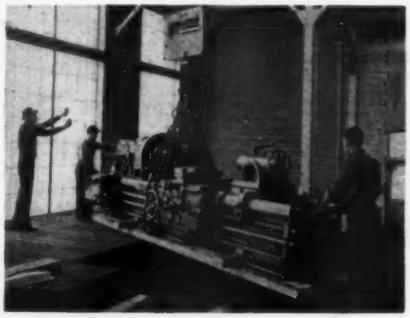
Fixture and tooling equipment can be furnished on Bore-Matics to form multiple operations in a part. For example the Bore-Matic shown at the right finishes thirteen different surfaces. Operations include boring, facing, turning and grooving.



THE HEALD MACHINE CO. WORCESTER, MASS. U. S. A.

AMERICAN MACHINIST

January 22, 1942



More Tanks, More Planes — Added equipment is the first essential of expansion for bigger war schedules

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29th BUYERS REFERENCE NUMBER

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Put This Issue to Work For You

To Find:

Descriptions of New Equipment, Tools, Materials, Supplies—Editorial content is classified under six headings, covering broad subdivisions. Immediately following each section divider are summarized descriptions and illustrations of items from the *American Machinist* Shop Equipment News sections during 1941. Almost 1000 items are included.

Details of Any Equipment, Tools, Materials, Supplies—Obtain list of makers under appropriate heading in Where-to-Buy Directory (which also has its own section divider) at back of book, then check their advertisements, using Advertisers' Index (inside back cover) to find page numbers. Or look through entire section devoted to the group under which the product is classified as shown by Table of Contents (page 1.)

Names of Leading Manufacturers of A Desired Product—Check the proper one of the almost 600 headings in the Where-to-Buy Directory. When a manufacturer's name is starred, you can find additional information in his advertisement in this issue.

Possible Sub-Contractors for Manufacturing or Services—See the Directory of Contract-Work Facilities and accompanying advertising following Section Divider.

Used Equipment, Tools, Etc.—See the Searchlight Section, immediately following Contract Work, for items available for immediate delivery.

A Particular Manufacturer's Complete Line—Advertising pages contain detailed data on individual companies. These pages, too, are classified in the eight sections listed on page 1.

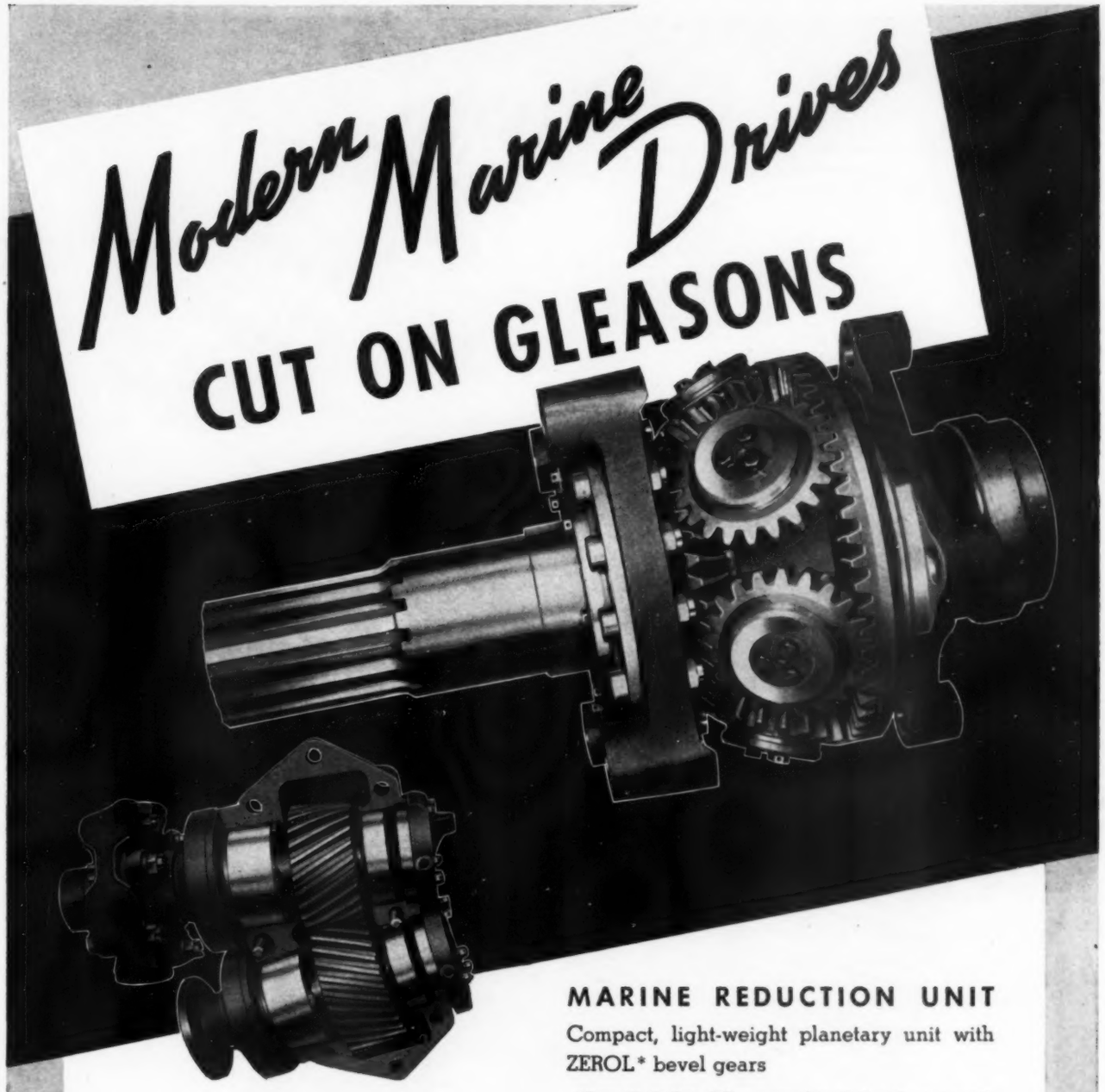
YOUR YEAR-ROUND BUYING REFERENCE

The 29th Annual Review & Catalog Number

AMERICAN MACHINIST

Modern Marine Drives

CUT ON GLEASONS



V BOAT DRIVE

With angular spiral bevel gears, engine is mounted horizontally in stern for best weight distribution

MARINE REDUCTION UNIT

Compact, light-weight planetary unit with ZEROL* bevel gears

*Reg. U. S. Pat. Off.—curved-tooth bevel gears with zero spiral angle and same low thrust loads as straight bevel gears.

For engineering recommendations on bevel and hypoid gears, write Gleason Works

GLEASON

GLEASON WORKS

Builders of Bevel Gear Machinery for Over Seventy-five Years

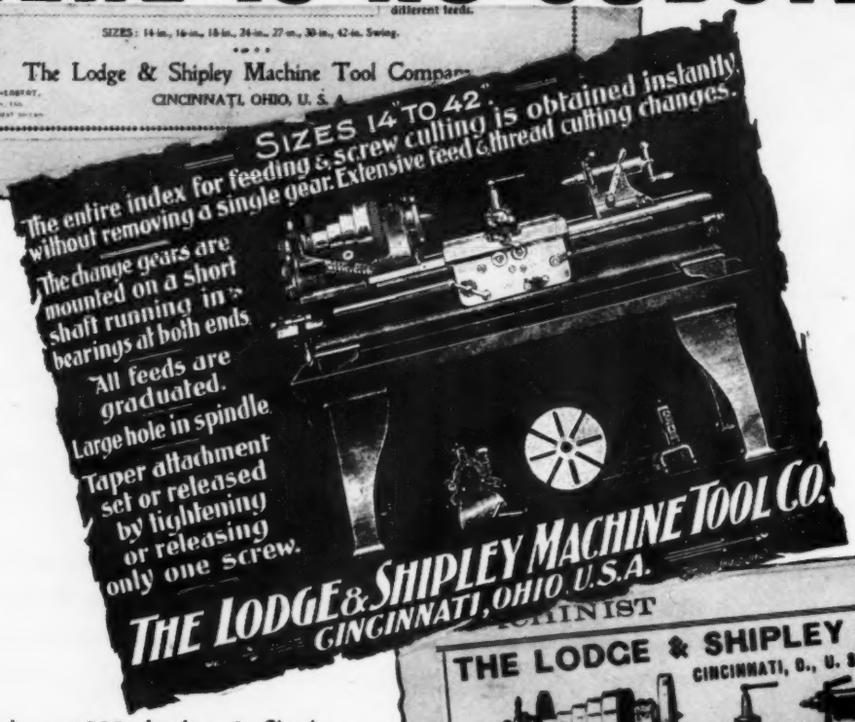
1000 UNIVERSITY AVENUE, ROCHESTER, N. Y., U. S. A.

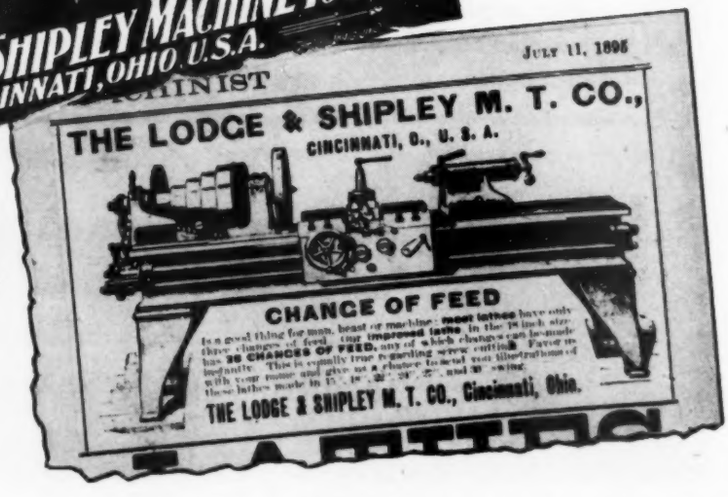
† Belt-driven step pulleys and loose transposing gears now eliminated on Lodge & Shipley lathes.

✻ With 19 patented features, Lodge & Shipley lathes were doing work of outstanding accuracy in 1892.

AMERICAN MACHINIST
It's so Simple.
You just slide the gear on
opposite the thread desired, as
shown on the index plate;
different feeds.
SIZES: 14-in., 16-in., 18-in., 24-in., 27-in., 30-in., 42-in. Swing.
The Lodge & Shipley Machine Tool Compan
CINCINNATI, OHIO, U. S. A.

THERE IS NO SUBSTITUTE


SIZES 14" TO 42"
The entire index for feeding & screw cutting is obtained instantly without removing a single gear. Extensive feed & thread cutting changes.
The change gears are mounted on a short shaft running in 2 bearings at both ends.
All feeds are graduated.
Large hole in spindle.
Taper attachment set or released by tightening or releasing only one screw.
THE LODGE & SHIPLEY MACHINE TOOL CO.
CINCINNATI, OHIO, U.S.A.



As far back as 1895, Lodge & Shipley lathes were offering 28 quick changes of feed and threads. This at a time when most lathes transposed gears for selecting threads and shifted belts for changing feeds.

A year later 40 thread and feed changes were offered, without changing a single gear—the customer then, as now, was getting a truly profitable tool.

Years of trial, experiment, practice, years of bettering performance for the user—putting into his hands always a more profitable tool is the background of the modern Lodge & Shipley lathe—the background behind their reliability, speed, and power.

Today we are at war. We cannot do too much, nor do it too fast. This ability to stand up under pressure makes Lodge & Shipley lathes outstanding performers in defense.

since 1892

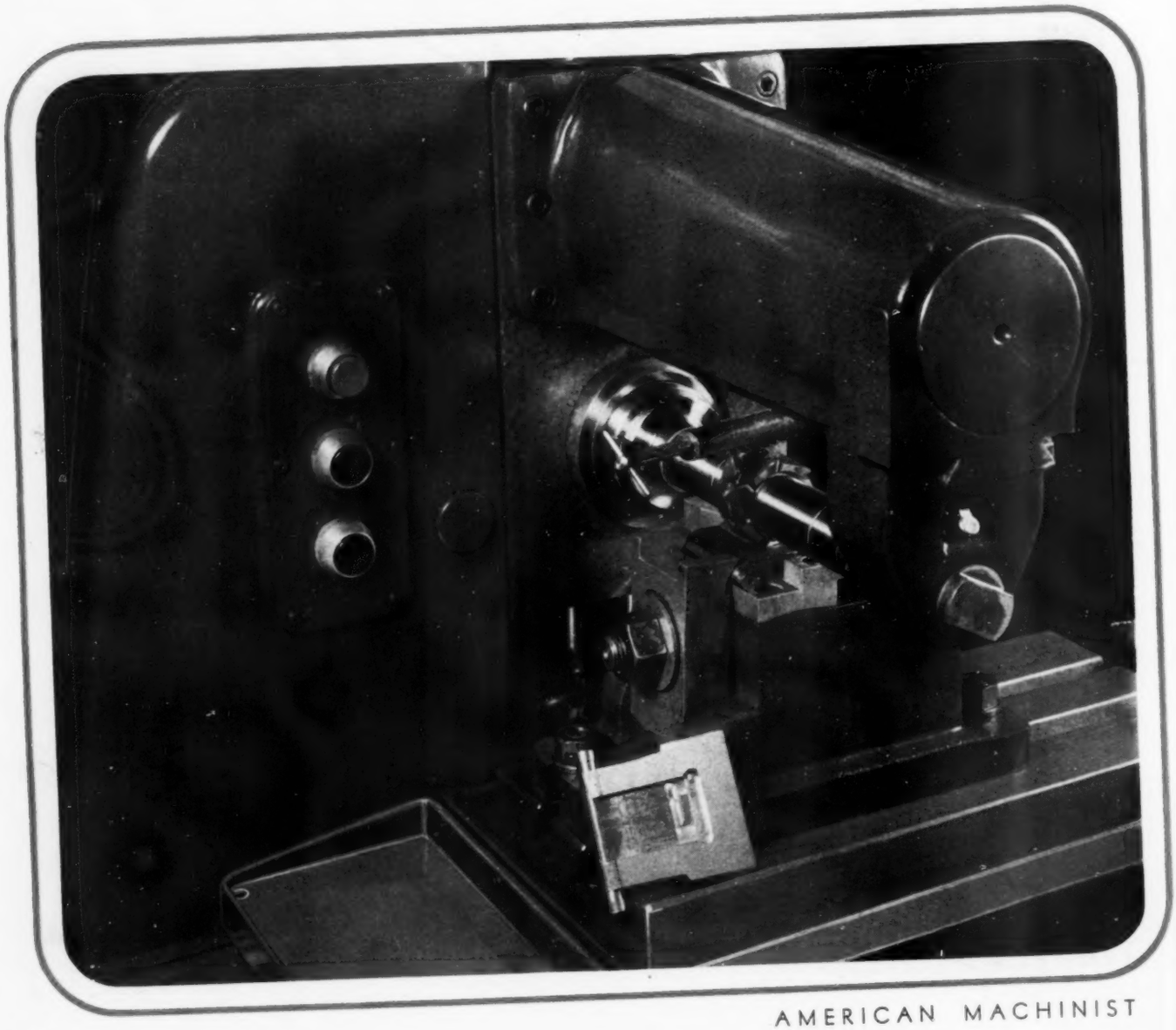
THE LODGE & SHIPLEY MACHINE TOOL CO.
CINCINNATI, OHIO, U.S.A

Engine *Tool Room* *Automatic Lathes*

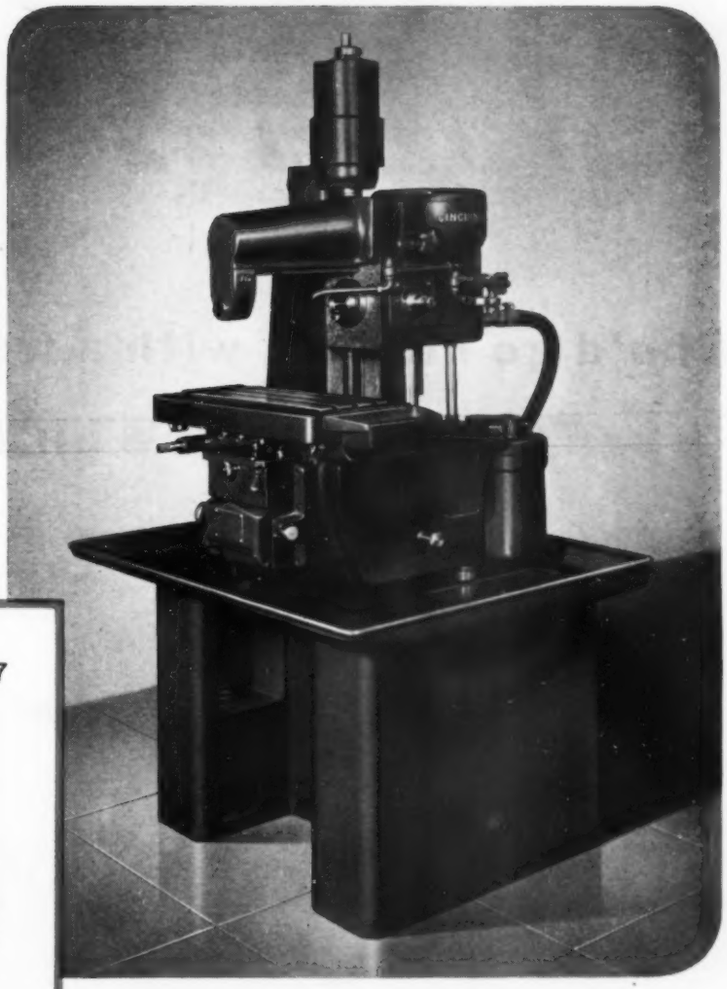
CINCINNATI

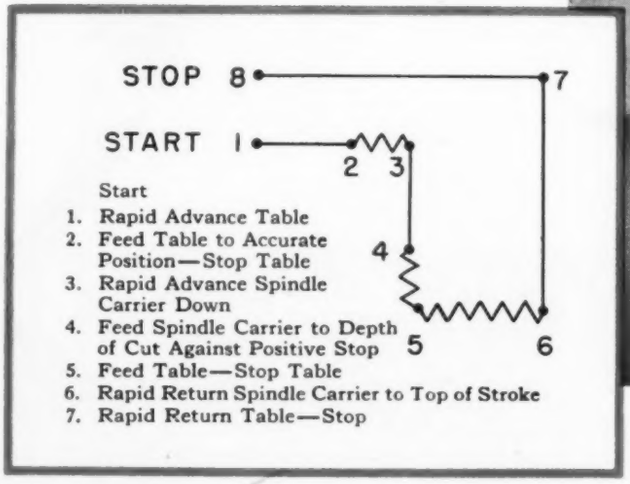
FULL SPEED

WITH CINCINNATI No. 0-8 PLAIN AUTOMATICS



AHEAD





Start
1. Rapid Advance Table
2. Feed Table to Accurate Position—Stop Table
3. Rapid Advance Spindle Carrier Down
4. Feed Spindle Carrier to Depth of Cut Against Positive Stop
5. Feed Table—Stop Table
6. Rapid Return Spindle Carrier to Top of Stroke
7. Rapid Return Table—Stop

A high rate of productivity, extreme accuracy, ease of operation, dependable performance and adaptability to a wide range of small parts are some of the benefits accruing to users of CINCINNATI No. 0-8 Plain Automatic Milling Machines. In defense work the No. 0-8 is being called upon for practically continuous, high speed operation to keep the assembly lines of America running smoothly and uninterruptedly.

In the illustration at the left a CINCINNATI No. 0-8 is milling a groove in a gun locking device. Here the No. 0-8 with Rise and Fall Spindle carrier is used because it is not possible for the table (work) to traverse directly into the cut. For all such operations the CINCINNATI No. 0-8 is especially desirable. Operating cycle is shown in the diagram above.

If you mill small parts you should investigate the possibilities of CINCINNATI No. 0-8 Plain Automatic Milling Machines. They will save time, do the job better and do it more accurately. They possess many unusual, exclusive features you're going to like and want. Specification catalog M-964 contains complete information on all features and their benefits. Send for your copy today.

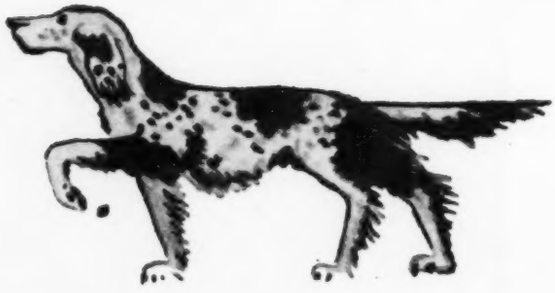
SAVE *with a Cincinnati!*

THE CINCINNATI MILLING MACHINE CO.

Cincinnati, Ohio U. S. A.

TOOL ROOM AND MANUFACTURING MILLING MACHINES
SURFACE BROACHING MACHINES • CUTTER SHARPENING MACHINES

Who'd go hunting with a wolf when he could have a bird dog?



Perhaps such a trip would end by the wolf devouring the hunter!

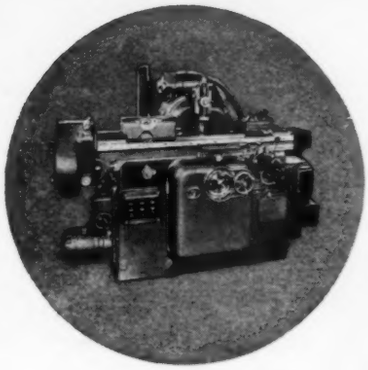
On the other hand, a trained bird dog can handle many types of birds under a wide range of conditions and afford his master many a profitable day in the field.

The same common sense considerations hold good when you're choosing machine tools.

Special machinery can be resorted to for wartime production, but whenever possible, wise management avoids it. Valuable time is eaten up designing and building special machines. Even under conditions where their cost can be amortized promptly, this does not solve the problem of re-equipping your plant to earn profits when peace-time competition replaces war's demands.

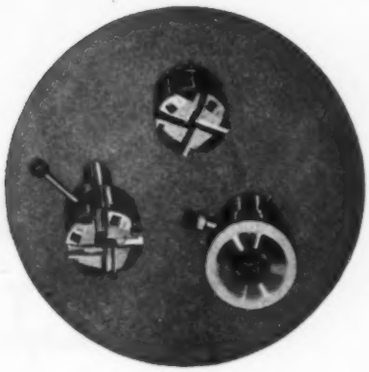
High-speed, long-lived and adaptable Jones & Lamson standard equipment can be turned by contrast from speeding emergency work to help rebuild a war-torn world.

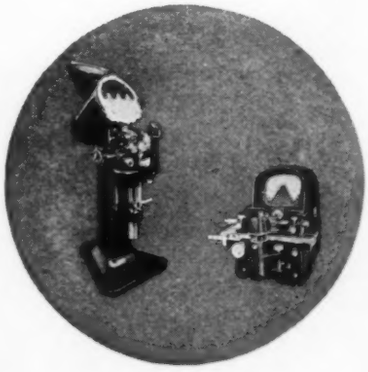
That's why farsighted management finds it pays to put present production problems up to Jones & Lamson engineers.



Automatic Thread Grinders

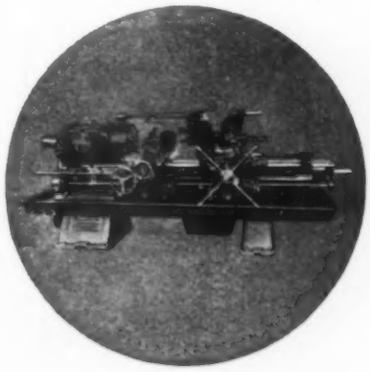
Automatic Opening Die Heads





Optical Comparators

Ram & Saddle Type Universal Turret Lathes

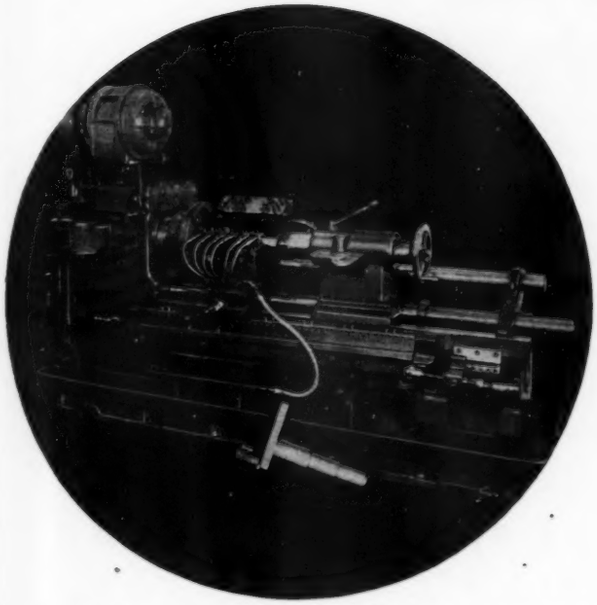


JONES & LAMSON MACHINE COMPANY

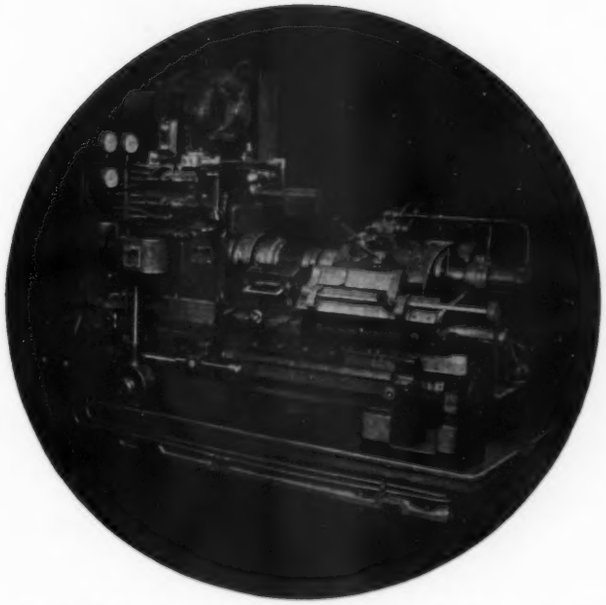
PROFIT PRODUCING MACHINE TOOLS

SPRINGFIELD, VERMONT, U. S. A.

MANUFACTURERS OF: RAM & SADDLE TYPE UNIVERSAL TURRET LATHES . . . FAY AUTOMATIC LATHES . . . AUTOMATIC THREAD GRINDING MACHINES . . . COMPARATORS . . . AUTOMATIC OPENING THREADING DIES AND CHASERS.



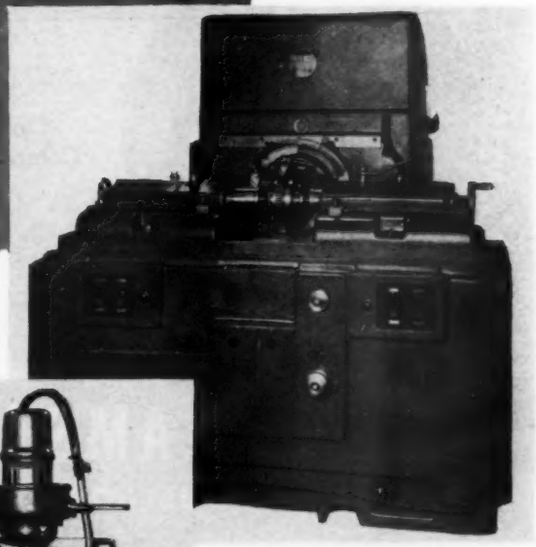
Jones & Lamson 20" Fay Automatic Lathe tooled to machine a single throw airplane engine crankshaft.

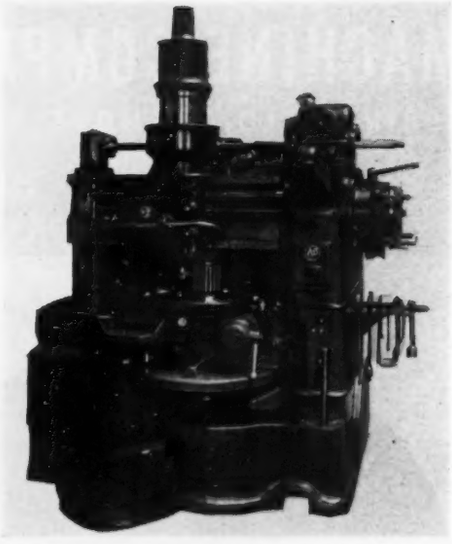


Jones & Lamson 16" Fay Automatic Lathe tooled to fin air-cooled airplane engine cylinders.

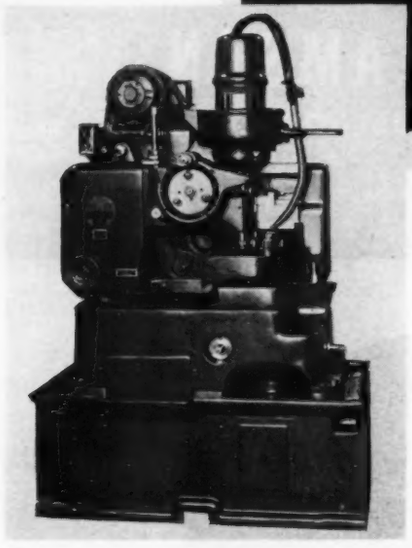
THE FELLOWS METHOD

Co-





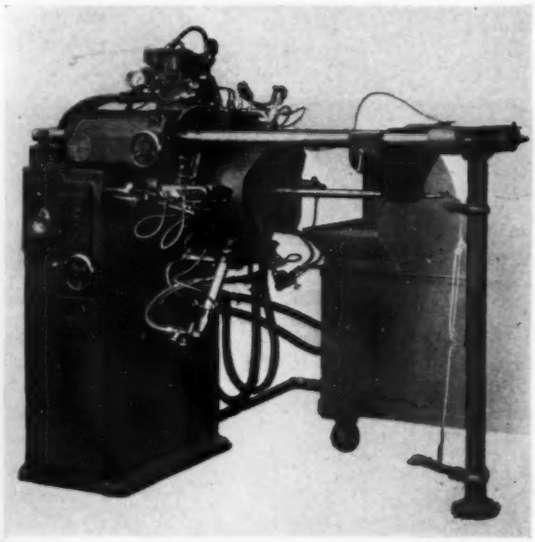
FOR PRECISION GEAR CUTTING: 6, 6A - type, and other types of Gear Shapers are now being built in capacities up to 100 inches pitch diameter. All of these different types of machines utilize Fellows Gear Shaper cutters, which are generally recognized as being the most highly developed precision tools for generating tooth forms, cams, splines and interrupted outlines on a production basis.



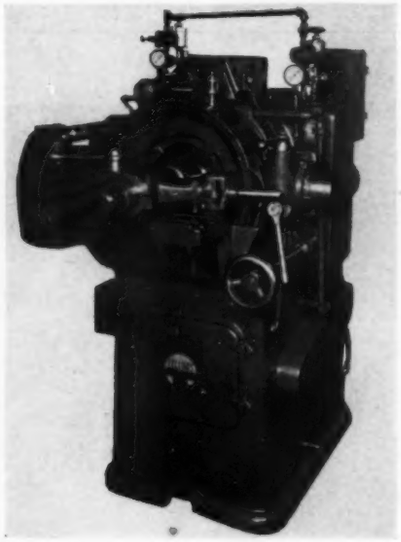
FOR HIGH-SPEED GEAR CUTTING: 7- and 7A- types of machines will handle spur and helical gears up to 7 inches pitch diameter. For fine-pitch gears there are two types of machines: The 3-inch fine pitch Gear Shaper and the Straight-line Gear Generator. Both machines are adapted to the cutting of both spur and helical gears. The 3-inch machine will handle both external and internal gears.

FOR GEAR FINISHING Fellows builds five different machines having maximum capacities of 4, 8, 12, 18 and 24 inches pitch diameter. These machines employ rotary-type of finishing tools operating on the crossed-axis principle. All machines are of exceptionally rigid design and are adapted to the accurate finishing of gears on a high-production basis.

ordinated **FOR PRECISION GEAR PRODUCTION**



FLAME HARDENING is brought to a high state of practical usefulness in the Fellows Flame Hardener. This machine has a maximum capacity of 10½ inches diameter. It is provided with electrical time control which assures controlled duplication of hardening results.



FINISHING AFTER HARDENING is taken care of on Fellows Lapping Machines, which can be arranged both for external and internal spur and helical gears. In most cases flame hardening so minimizes gear distortion, that lapping alone suffices for final finishing. Slight errors can be rapidly corrected without destroying tooth profiles.

INVOLUTE CHECKING & GEAR TESTING: Involute profiles of gear teeth can be accurately checked and errors recorded on Fellows Involute Measuring Machines. Gears can be tested in a condition closely approaching that of actual operation on Fellows Red Liners, and all errors in combination permanently recorded. Both machines can be employed at any and all stages of production. The precision possibilities of Fellows Production Machines are fully realized under these methods of inspection control.

THE 1942 line-up of Fellows Gear cutting, hardening, finishing and testing equipment provides a complete series of machines for coordinated production. The advantages of the Fellows Method is that production routine is so integrated that each operation is performed to the same high standard of accuracy, and thus overall costs are held to the minimum. We will welcome the opportunity to send you our latest literature. Write:

THE FELLOWS GEAR SHAPER COMPANY

Springfield, Vermont

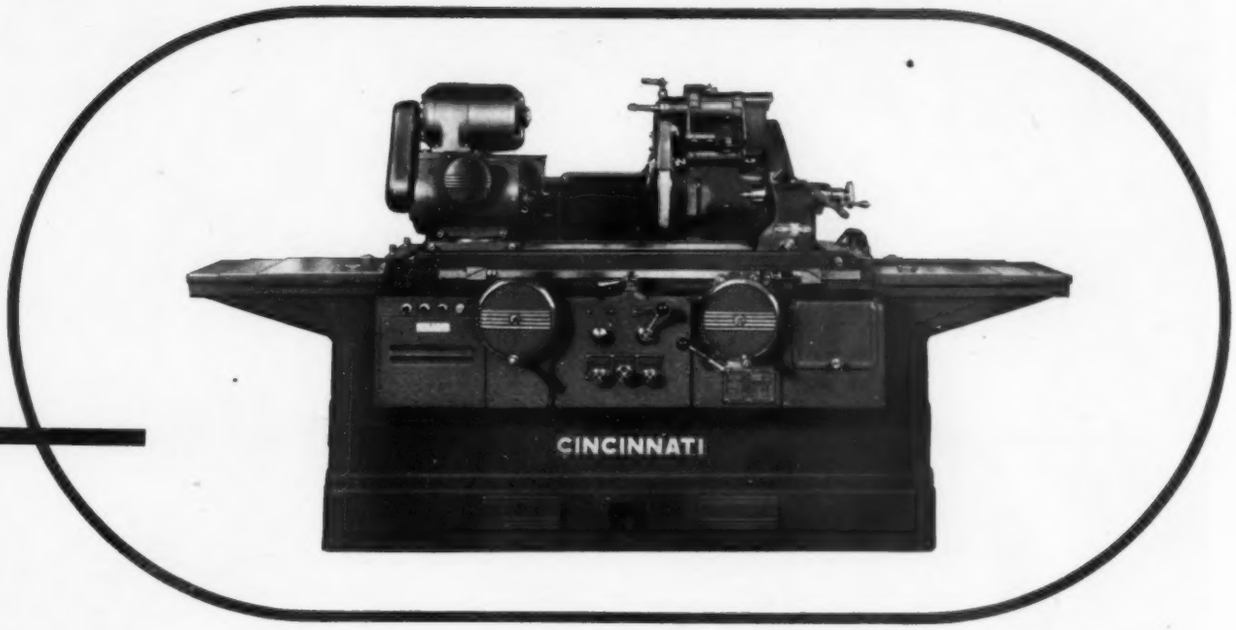
Detroit Office: 616 Fisher Building • Chicago Office: 640 West Town Office Building

THE FINEST GRINDING MACHINE

you can buy!

CINCINNATI Hydraulic Universal Grinding Machines are available in 12", 14", 16" and 18" swings; between-center distances up to 72". There is a size to fully meet your requirements.

CINCINNATI



In addition to the features usually found in a grinding machine, you get all these *extra* advantages as standard equipment when you buy a CINCINNATI Hydraulic Universal:

FILMATIC Grinding Wheel Spindle Bearings • Hinged Type Internal Grinding Attachment Driven by Independent Motor • Infinitely Variable Work Speeds • Accuracy of Table Reversal Within .004" • Dog-Controlled Table Reciprocation from 3/32" to Full Table Stroke • Independent Right- and Left-Hand Tarry Adjustments • Two-Speed Hand Cross Traverse • Table Ways Protected by Telescopic Guards.

Taking into consideration all the time- and effort-saving features incorporated in CINCINNATI Hydraulic Universals, we believe they are the finest grinding machines for toolroom and general manufacturing work you can buy. They are so accurate a .0001" limit is practical; they assure Faster Set-Up, Faster Handling, Faster Grinding and Faster Sizing with operating effort greatly reduced and maintenance practically eliminated. One CINCINNATI Hydraulic Universal Grinder will replace two machines of an older type, and your operator need not be a top grade mechanic — an important consideration in times like these.

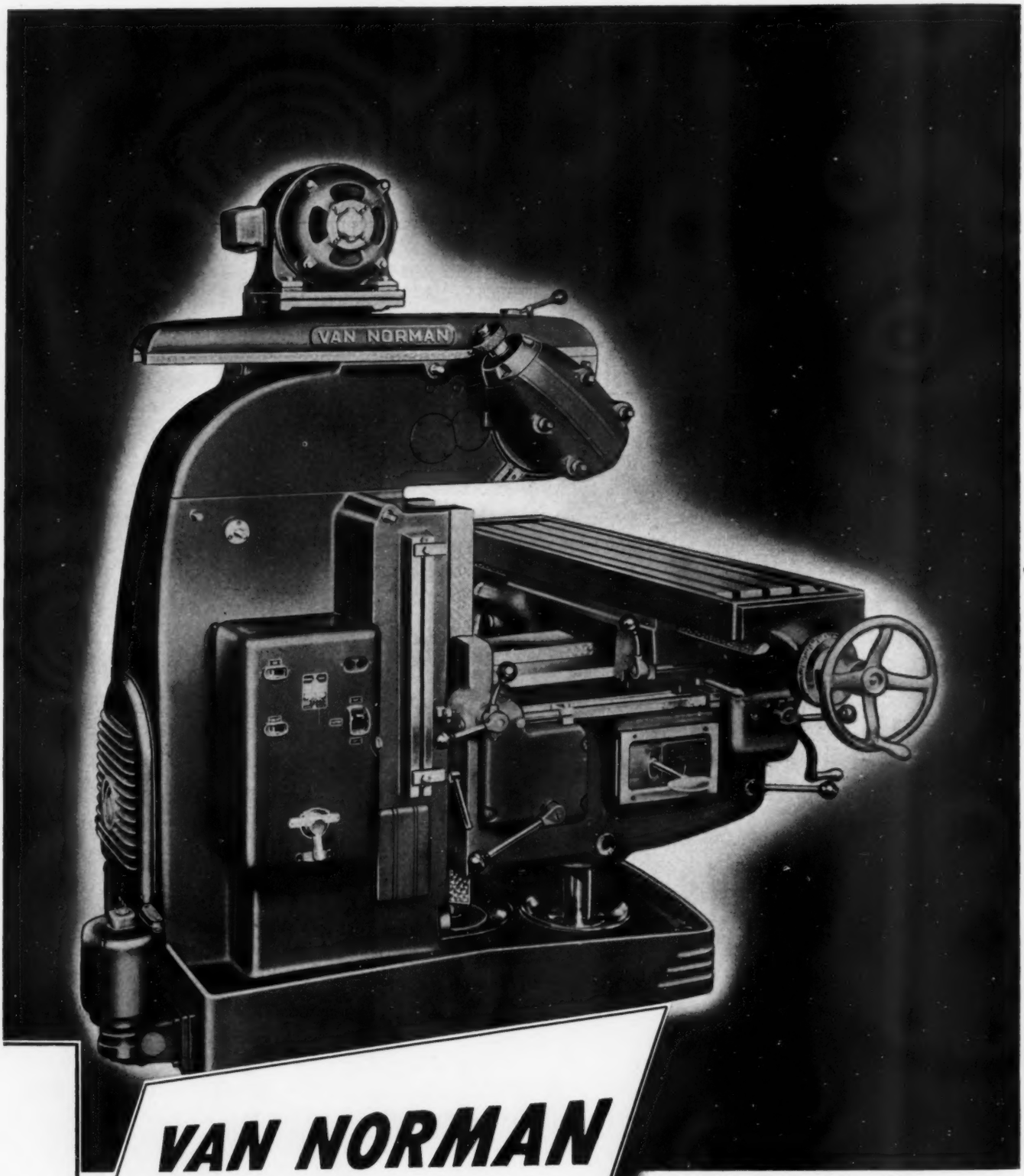
Specification catalogs G-474 and G-486 give complete details on all features and their benefits. Send for your copies today.

SAVE with a Cincinnati!

CINCINNATI GRINDERS INCORPORATED

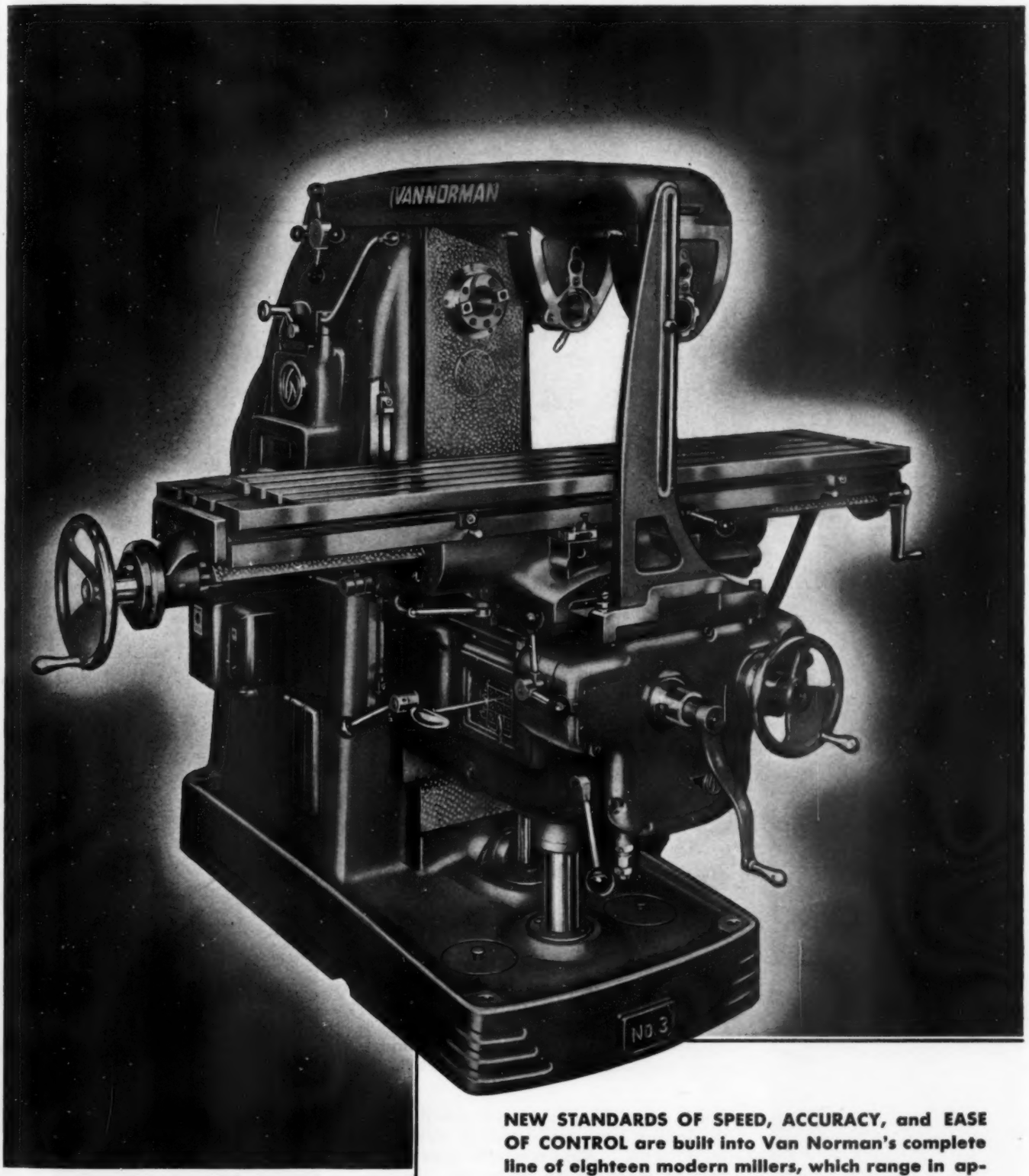
Cincinnati, Ohio U. S. A.

CENTER TYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES



VAN NORMAN
Milling Machines

No. 26 RAM-TYPE UNIVERSAL MILLER:
Table: 50" x 12"
Range: 28" longitudinal, 12" cross, 18" vertical
18 Speeds: 30 to 1500 rpm
18 Feeds: ⅜" to 32"



No. 3-S HORIZONTAL KNEE-TYPE MILLER:
Plain and Universal
Table: 64" x 14"
18 Speeds: 25 to 1250 rpm
18 Feeds: ⅜" to 32"
6-way power feed front and rear directional controls

NEW STANDARDS OF SPEED, ACCURACY, and EASE OF CONTROL are built into Van Norman's complete line of eighteen modern millers, which range in application from the toolroom to the production line. And Van Norman's more than half-century tradition of quality underwrites your investment in all of these fine machine tools. There are no finer made in the world today.

VAN NORMAN MACHINE TOOL CO.
Springfield, Mass.

MARVEL SAWS

Cut anything that will fit between the jaws

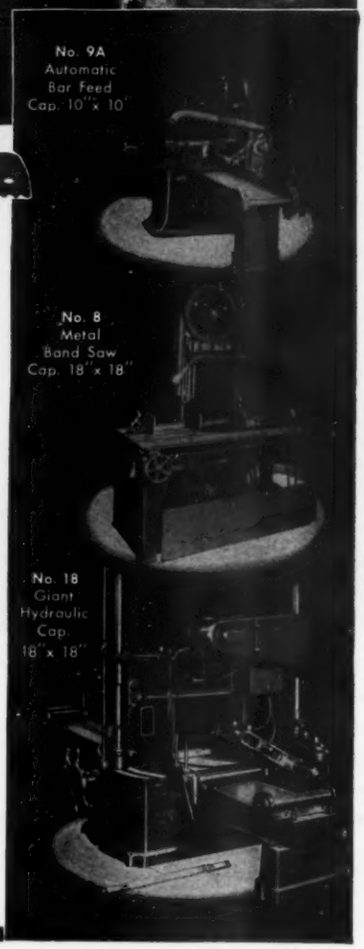
This is one of five No. 18 MARVEL Giant Hydraulic Hack Saws used by a well known Texas tool company to cut-off "multiple bars of alloy steel in round, square, and flat shapes, up to the maximum capacity of the large work-throat (18" x 18")".

These super hack saws are designed for the largest sizes, and toughest steels—up to 18" x 18". After a year's heavy duty service, when asked as to the effectiveness of these saws in solving the cutting-off problems at this plant, the mechanical engineer in charge reported them "very effective."

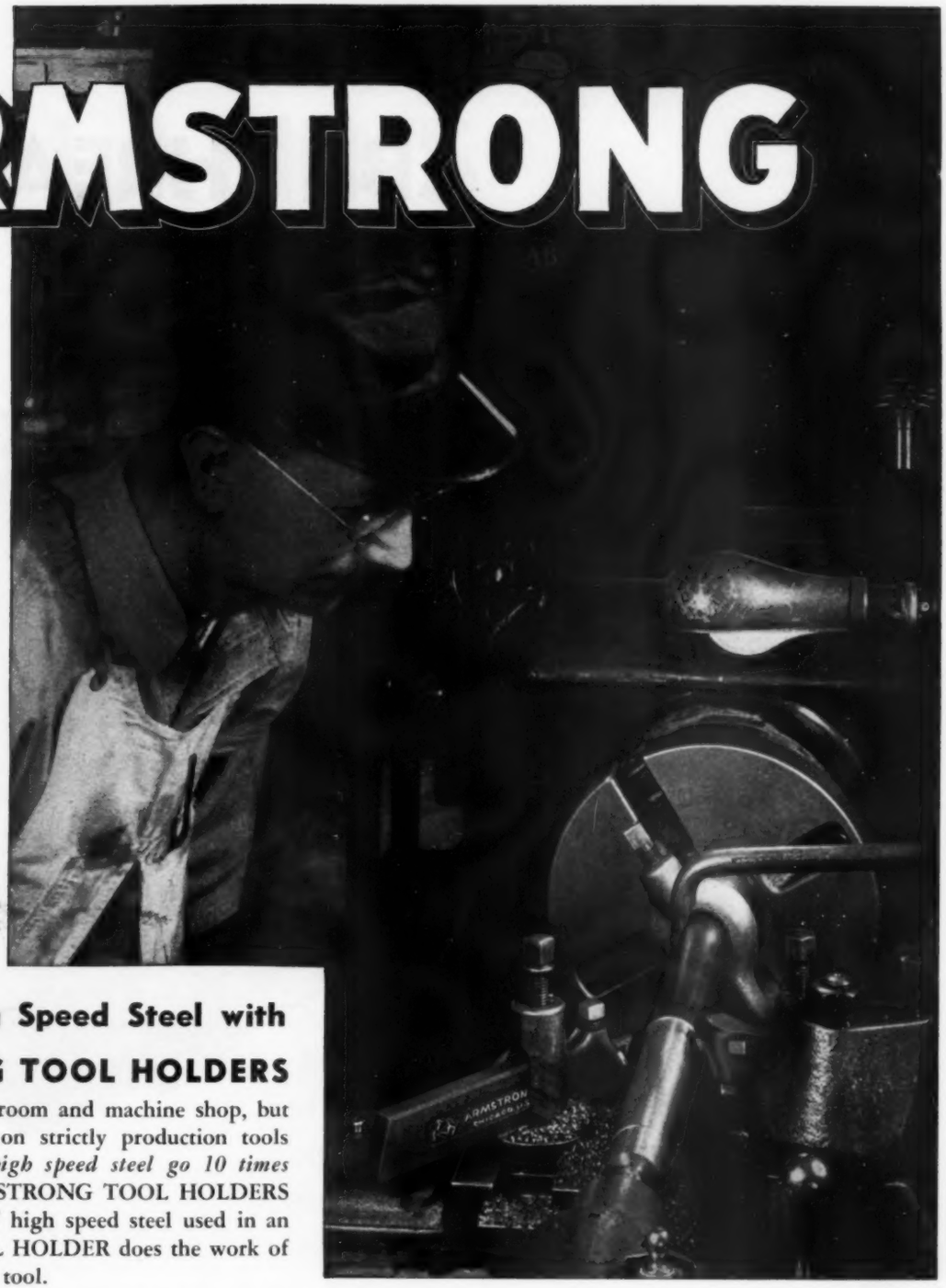
ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave. Chicago U. S. A.
Eastern Sales Office: 225 Lafayette St., New York



ARMSTRONG



Conserve High Speed Steel with

ARMSTRONG TOOL HOLDERS

Not only in the tool room and machine shop, but for many operations on strictly production tools you can *make your high speed steel go 10 times as far* by using ARMSTRONG TOOL HOLDERS because each ounce of high speed steel used in an ARMSTRONG TOOL HOLDER does the work of 10 ounces in a forged tool.

The "Armstrong System" comprising Armstrong Tool Holders in hundreds of sizes and shapes provides permanent multi-purpose tools with strength to stand up to *any* speed or feed, tools for every operation on lathes, planers, slotters and shapers and for many operations on engine lathes, turret lathes and screw machines.

Use ARMSTRONG TOOL HOLDERS wherever possible and "Save: All Forging, 70% Grinding and 90% High Speed Steel."

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

315 N. FRANCISCO AVE. CHICAGO, U. S. A.

Eastern Warehouse & Sales Office:
199 Lafayette St., New York

ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms

A THREADING TIP *for* '42

BE THREADWISE

The National Emergency demands More Production, Greater Accuracy, and Increased Economy—your Problem may be any one or all of these three.

LANDIS

MACHINE COMPANY, Waynesboro Pennsylvania

employ LANDIS

Regardless of your requirements remember that LANDIS Thread Cutting Machines and Die Heads are more essential than ever before, because they will more efficiently meet these demands for Maximum Operating Efficiency.

The LANDIS *Line*

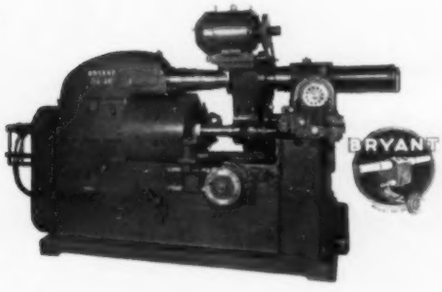
STANDARD THREADING MACHINES
LANDMACO THREADING MACHINES
BOLT FACTORY THREADERS
AUTOMATIC FORMING AND THREADING MACHINES
SEMI-AUTOMATIC THREADING MACHINES
PIPE THREADING AND CUTTING MACHINES
PIPE AND NIPPLE THREADING MACHINES
ROLLER PIPE CUTTERS
CHASER GRINDERS
ROTARY BOLT THREADING DIE HEADS
STATIONARY PIPE DIE HEADS
LANDMATIC HEADS FOR TURRET LATHES
LANDEX HEADS FOR AUTOMATIC SCREW MACHINES
LANCO HEADS FOR HAND-OPERATED THREADING MACHINES
LANDIS COLLAPSIBLE AND ADJUSTABLE TAPS
LANHYDRO (Hydraulically Controlled) THREADING MACHINES

—and *The Precision* THREAD GRINDER

Pull up a chair for B

r Bryant

WHEN your desk is snowed under with problems, production plans and blueprints, pull up a chair for Bryant. Every phase of a new job that relates to internal grinding is a phase that interests Bryant. Every angle and opportunity whereby time, money, stock or operations can be saved on these phases is a chance for Bryant to help you.

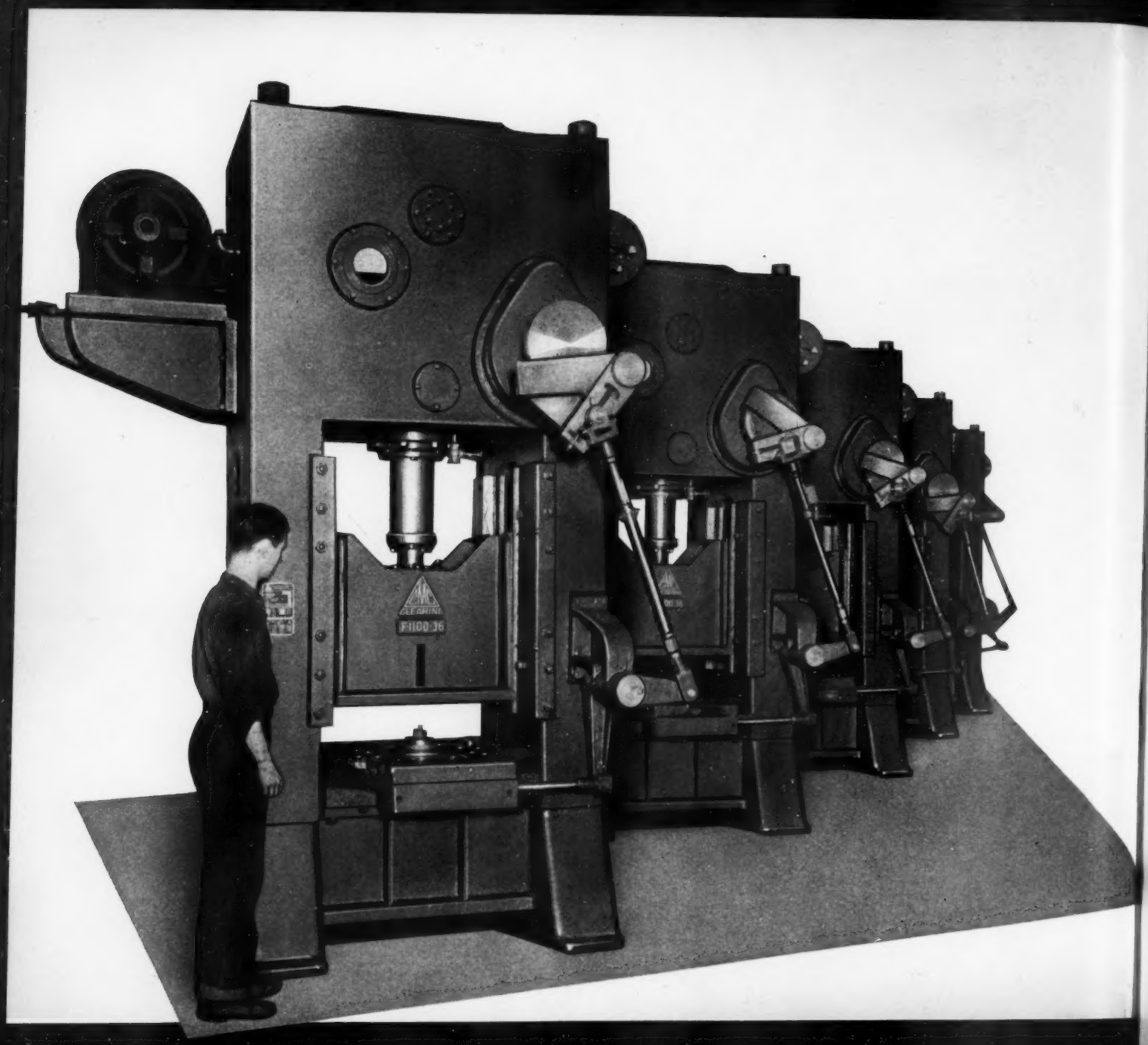


Bryant productive capacity has already been trebled and is constantly increasing to aid defense production. Bryant engineering service has also been stepped up — stepped up not only to meet the urgent needs of armament, but the equally vital problem of planning new products that can be made economically and sold at a profit when peace returns once more.

This is an added reason for the forward-looking executive to "pull up a chair for Bryant."

BRYANT CHUCKING GRINDER CO.

SPRINGFIELD, VERMONT, U. S. A.



Above is shown the CLEARING patented plunger guided slide suspension.

Two cartridge cases per stroke are produced with the use of the above ratchet dial feed used on CLEARING presses.

CARTRIDGE CASE PRODUCTION

WITH CLEARING CRANKLESS STEEL PRESSES

Illustrated is a unit of CLEARING Crankless Steel Presses designed for all the drawing operations of 20 MM Cartridge cases at a gross rate of 80 cases per minute.

Long die life with continuous 24 hour-a-day operation is assured by the *patented,* plunger guided slide, which entirely eliminates all side thrust and tilting. This is due to the large bearing surface of the plungers through the long bronze bushing in the Crown, in addition four individually adjustable gibs.

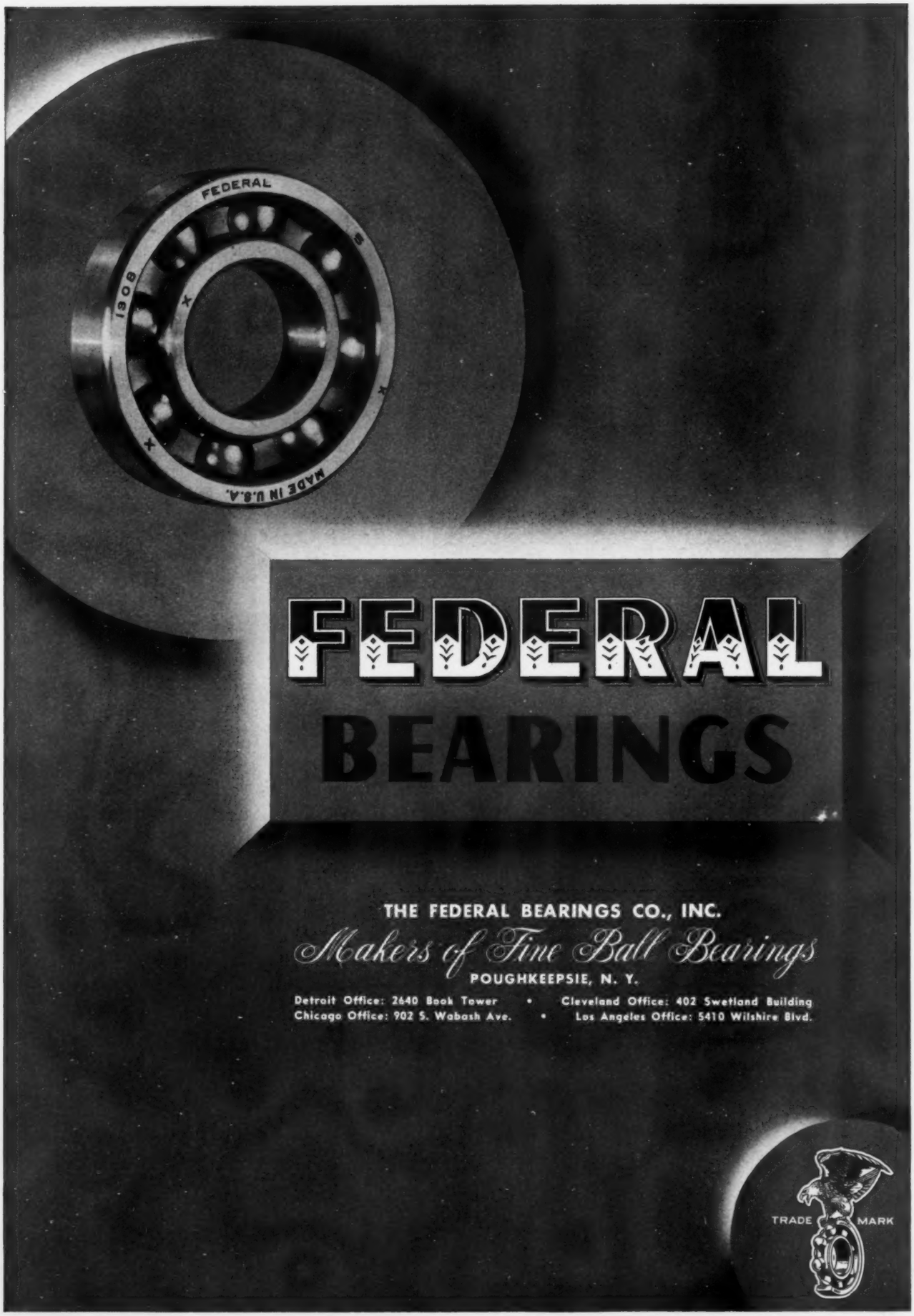
These presses are equipped with automatic ratchet dial feeds, which index at each stroke of the press and draw two cases at a time.

Other CLEARING Units are producing the Blanking, Cupping, Heading, Indenting and Tapering Operations on this size cartridge case at the same rate of speed. Similar units of CLEARING Presses will produce 37, 40, 75, 90, 105 and 155 MM Cartridge Cases at a high production rate.

CLEARING Engineers are available for immediate consultation.
Write today!

CLEARING MACHINE CORPORATION
6499 WEST 65th STREET, CHICAGO

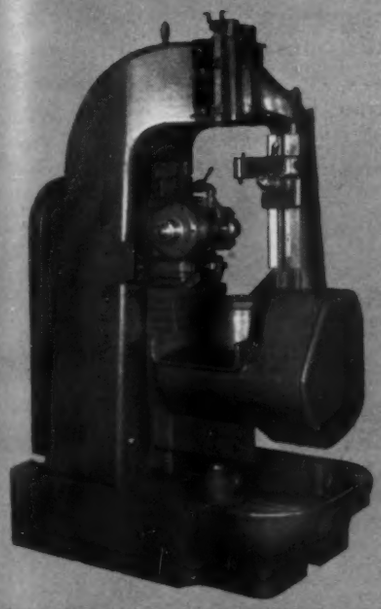
CLEARING
MACHINE CORPORATION
CHICAGO USA DETROIT


FEDERAL
1908
MADE IN U.S.A.
FEDERAL
BEARINGS
THE FEDERAL BEARINGS CO., INC.
Makers of Fine Ball Bearings
POUGHKEEPSIE, N. Y.
Detroit Office: 2640 Book Tower • Cleveland Office: 402 Swetland Building
Chicago Office: 902 S. Wabash Ave. • Los Angeles Office: 5410 Wilshire Blvd.
TRADE MARK

Build for future production schedules with --

The RIGIDHOBBER ....

Model 130



The Rigidhobber is the accepted method of producing gears in the automotive industry. 80% of all gears and splines hobbed in the automotive industry are hobbed on RIGIDHOBBERS.

Built in three models in single spindle type for gear hobbing.

Model	Max. Dia. Gr.	Max. Travel	Max. Length Pt.
130	8″	8″	19″
135	6″	8″	37″
140	8″	16″	23″

Max. Hob. Diameter . . . . . 4″
Hob Speeds . . . . . 80 to 300 r.p.m.
Feeds . . . . . .020 — .200
Floor Space with Door Open . . 36″ x 77″
Min. number of teeth cut 3

Also build the Model 155 for camshaft hobbing which is very similar to the model 135 in general design and construction.

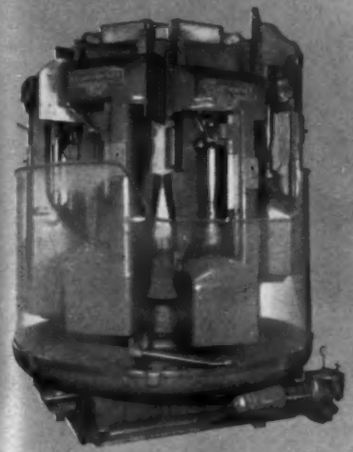
The Model 220 is an 8 Spindle Rotary Hobbing Machine designed for high production of duplicate work at exceptionally low costs. These machines are adaptable to a wide variety of work and have gained a favorable reputation for maintaining accuracy on duplicate work in quantity.

Model 220

The RIGIDTURNER ....

This compact, sturdy machine has revolutionized the turning of multiple diameter work in both small and large lots due to its accuracy —high productivity and ease of changeover.

8 Spindle Rotary Model



Important specifications of Model 616 follow:

Model	Max. Dia. Pt.	Max. Travel	Max. Length Pt.
616	6″	16″	23″

Floor Space 36″ x 90″ with Door Open.

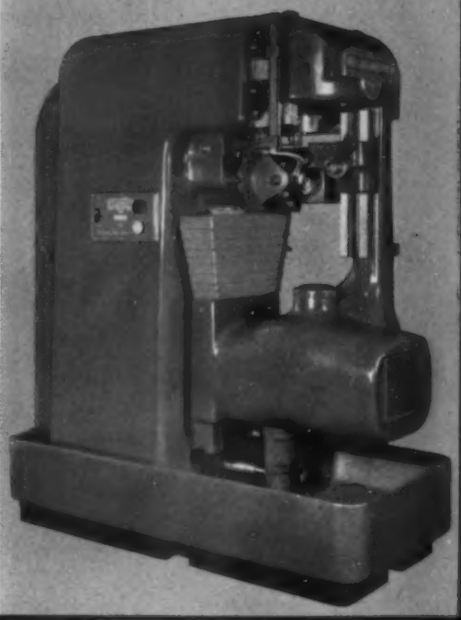
This machine is also built in an 8 Spindle Rotary Model for the high production of duplicate parts that meet rigid tolerance limits.

A NEW METHOD

These machines introduce an entirely new method of turning by which a disc type cutter is mounted on an arbor. The work in a vertical position, is revolved past the cutter which in turn is rotated in timed relation to produce concentric or tapered diameters on the job. One pass of the cutter completes an operation.

For complete details on any of the above machines, write for bulletins. No obligation. We will gladly furnish estimates from either your samples or blue prints.

Model 616



THE CLEVELAND HOBBING MACHINE CO.

CLEVELAND, OHIO - - - U. S. A.

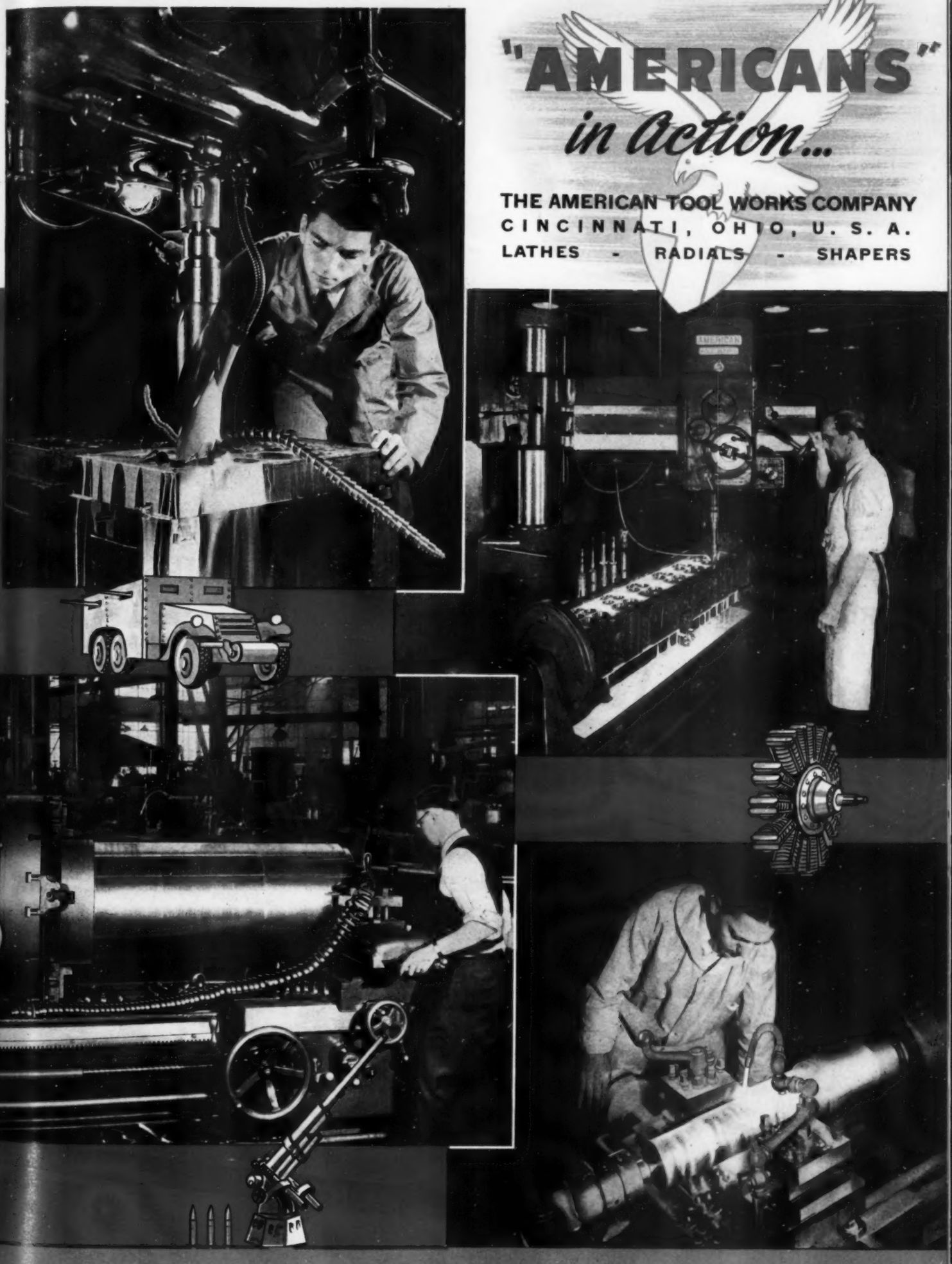
"AMERICANS"
In Action For National Defense

The defense program demands not only all available man hours for production, but machine tools that will make those man hours most productive.

In every defense industry "Americans" are contributing to the speed-up demanded by our defense emergency. In every defense industry their performance has established them as leaders in the battle for faster, lower-cost production. Their adaptability, speed, power, precision and stamina have won for them undisputed leadership in the production lines of our largest and most prominent defense contractors. "Americans" have gone into action in a big way for National Defense.

The accompanying pictures show "American" Pacemaker Lathes and "American" Hole Wizard Radials hard at work meeting demands of the defense program in the production of airplanes, tanks, guns, shells, engines, precision instruments, battleships and tractors.

THE AMERICAN TOOL WORKS COMPANY
CINCINNATI, OHIO, U. S. A.
LATHES - RADIALS - SHAPERS


"AMERICANS"
in Action...
THE AMERICAN TOOL WORKS COMPANY
CINCINNATI, OHIO, U. S. A.
LATHES - RADIALS - SHAPERS

THREE "EXTRA PROTECTION" FEATURES GIVE EVERY TRI CLAD MOTOR GREATER STRENGTH AND LONGER LIFE

1 *Extra Protection* against physical damage

2 *Extra Protection* against electrical breakdown

3 *Extra Protection* against operating wear and tear

ARMORED CONSTRUCTION . . . SMOOTH CONTOURS . . . RIGID ALIGNMENT

Strong, one-piece, cast-iron frame and cast end shields, with upper portion completely enclosed, protect vital motor parts from external blows, falling objects, or dripping liquids. There's less chance of damage in installation, or in operation under "slam-bang" conditions.

"FORMEX" WINDINGS . . . BONDED COIL UNITS

Stator windings of Formex wire give extra protection against moisture oil, abrasion, and heat-shock. New synthetic-resin bonding varnish and Glyptal No. 1201 Red on end-turns add to durability. You can count on uninterrupted performance and long life under strenuous conditions.

NEW BEARING DESIGN . . . ONE-PIECE, DYNAMICALLY BALANCED ROTOR

Sleeve bearings proportioned and grooved for protective lubrication under severe loads. Sleeve and ball bearings enclosed in strong, dust-tight housings. One piece rotor, with fans cast integrally, has new electrical and mechanical features assuring smooth, cool operation and high efficiency.

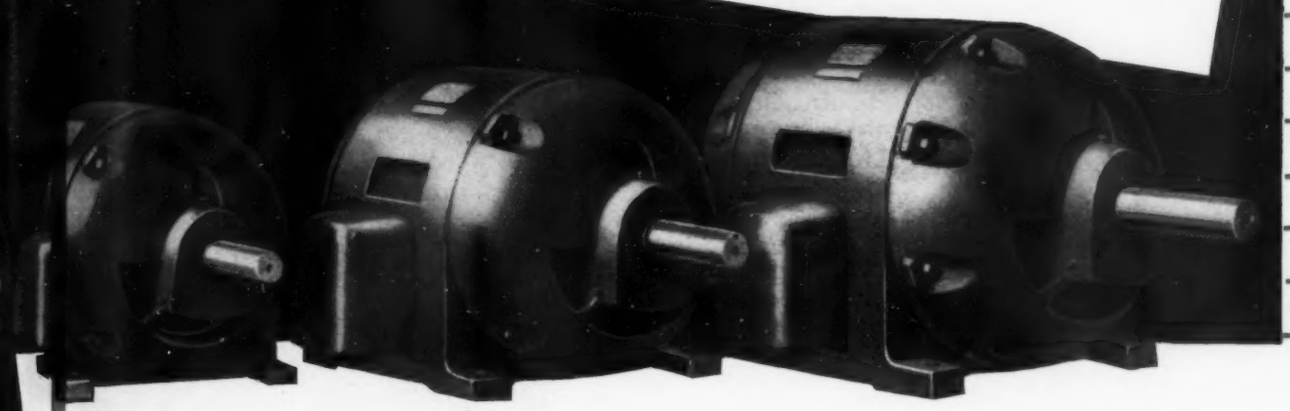
GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

BUILT FOR PROTECTION FIRST . . . TO LAST!

up!

NOW . . . . .

TRI/CLAD polyphase induction motors are available in integral-hp sizes through . . . . **75 hp**



75 hp
60 hp
50 hp
40 hp
30 hp
25 hp
20 hp
15 hp
10 hp
7½ hp
5 hp
3 hp
2 hp
1½ hp
1 hp

. . . a LARGER range of sizes!

. . . a WIDER scope of service!

The advanced design and triple-tough construction that won industry's enthusiastic acceptance almost overnight have now been extended to many larger motors in our a-c line.

General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of naval ordnance.

GENERAL ELECTRIC

750-104-8068

GLENN L. MARTIN COMPANY

GOES INTO HIGH GEAR WITH

Single Spindle AUTOMATICS

● Reproducing precision parts of Martin bombers in quantity calls for every modern type of machine tool, and among the essential types in the Martin plants for high speed production of *small lots and short runs* are Cleveland *Single Spindle* Automatics.

To visualize for you the wide adaptability of Cleveland Model A machines in this plant, there is now in operation, aside from older models, a battery of new Clevelands of latest type including 9/16-inch, 1 1/16-inch, 1 3/8-inch and 2 1/2-inch capacity, steadily at work producing a wide variety of parts for Martin aircraft.

Others are being built for Martin as well as for virtually every other large aircraft builder in this country, as fast as they can be produced. To make greater production possible, our own company has, of course, like all other machine tool builders, purchased many new machine tools for our own shops—in every instance stepping up production considerably. And too, we also have many more "on order," and like our own customers, we too must wait our turn in deliveries of these master tools of industry.

Cleveland *Single Spindle* Automatics are being built as fast as they can be produced in sizes from 1 1/16-inch up to 8-inch capacity, and every one of them is setting up its own achievement record in an "all out" production plan. Like Martin bombers each one is built to stand up and take it—a reputation Clevelands have earned over 50 years past. Ask for information to enable you to consider Clevelands in regard to your own problems.

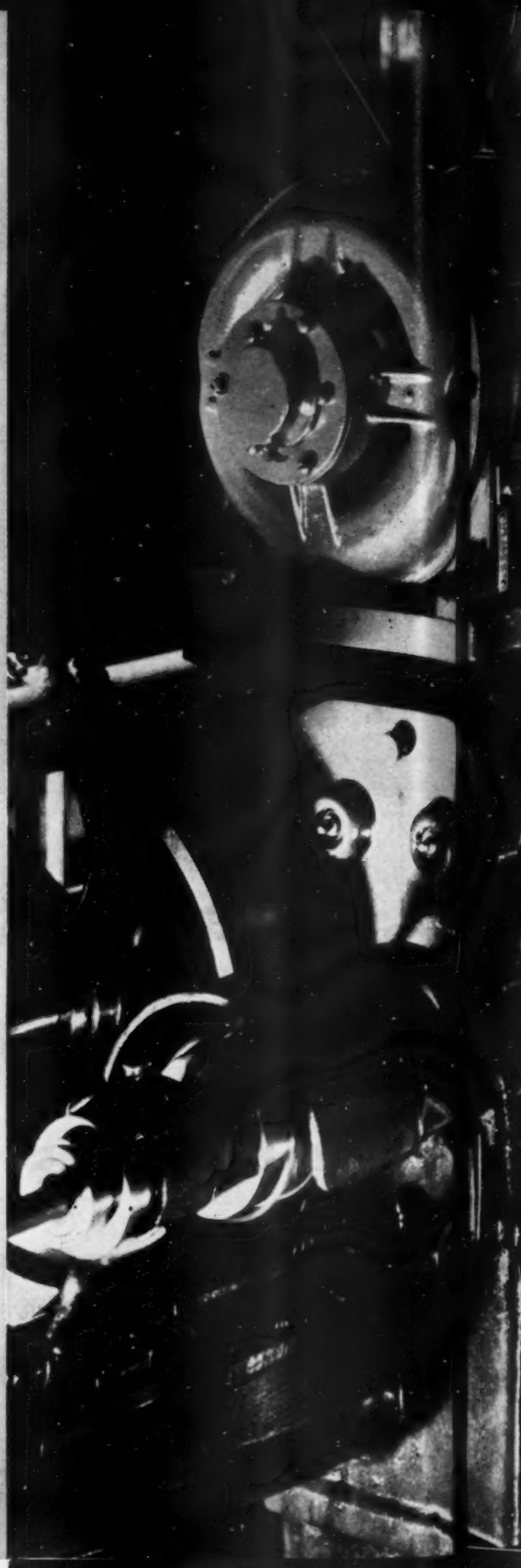
THE CLEVELAND AUTOMATIC MACHINE COMPANY

2269 ASHLAND ROAD • CLEVELAND, OHIO

Sales Offices: NEWARK—15 Washington Street • DETROIT—2842 W. Grand Boulevard
CHICAGO—565 West Washington Street • CINCINNATI—507 American Building

LET'S GO! U.S.A. · KEEP 'EM FLYING!

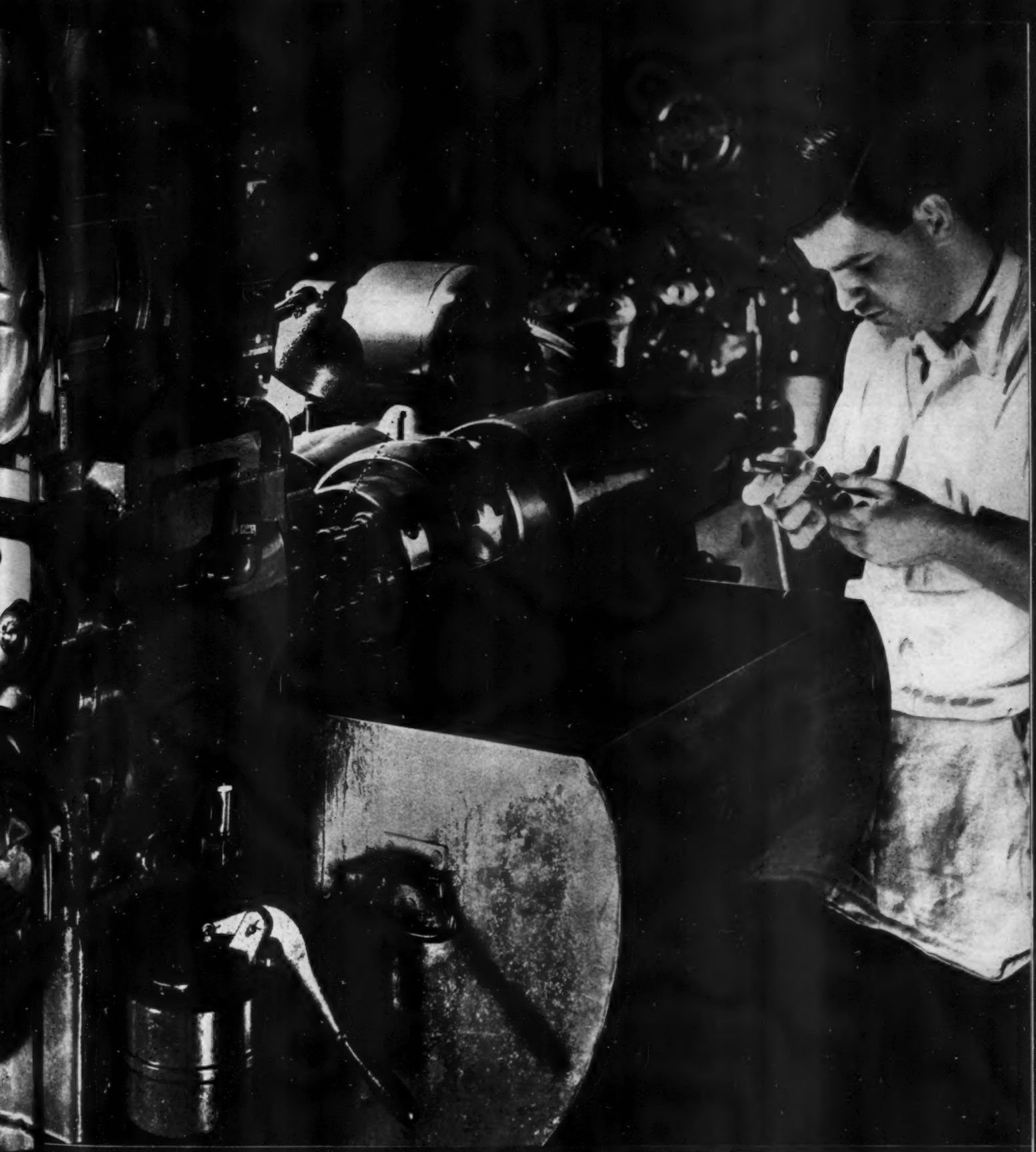
★ Marauder of the skies, the Martin B-26 bomber is now in quantity production, American-style, at the Martin plants in Baltimore. A so-called medium bomber type, its speed is greater than that of many pursuit aircraft of other countries and its bomb load nearly twice that of others rivaling its range and firepower.



MARTIN U.S.A. TRADE MARK

Martin AIRCRAFT

Photographed through the courtesy of
THE GLENN L. MARTIN COMPANY
Baltimore, Maryland



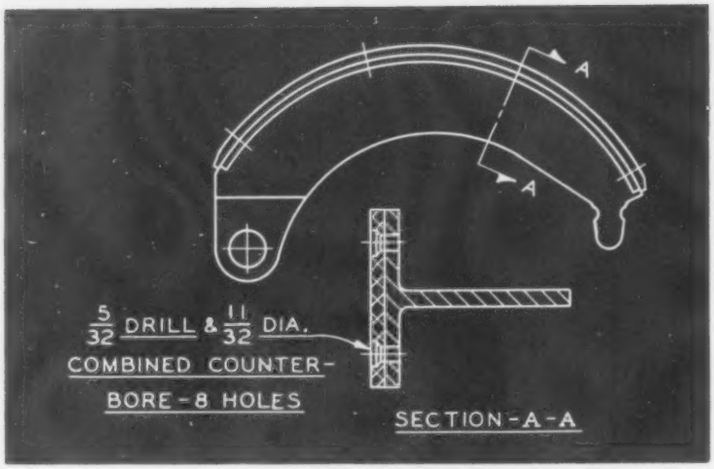
CLEVELAND

MODEL A *Single Spindle* AUTOMATIC

MODEL B—Built in $1\frac{1}{16}$-inch to $2\frac{1}{2}$-inch capacities inclusive

MODEL A—Built in $1\frac{1}{16}$-inch to 8-inch capacities inclusive

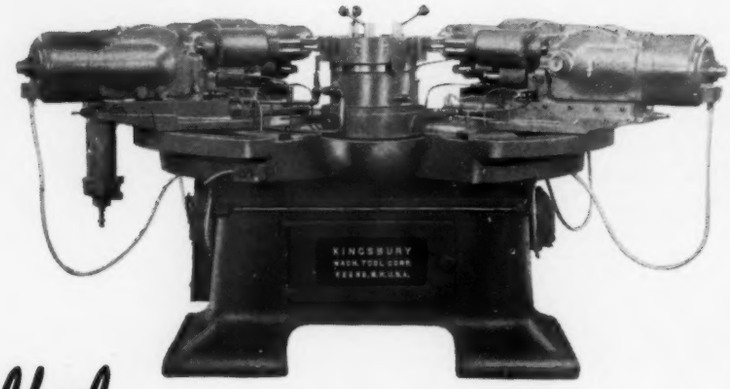
MODEL AA—Built in $1\frac{1}{16}$-inch and $1\frac{3}{8}$-inch capacities only



THIS IS A FLEXIMATIC

AUTOMOTIVE JOB!

Brake Shoe and Lining Production Speedily and Accurately Handled



FLEXIMATIC

by KINGSBURY

One important advantage of the FLEXIMATIC is the fact that it is a machine providing automatic indexing for performing various machining operations in a single chucking of the work.

This method is specifically applied to the Model GD Eight-Spindle Fleximatic arranged for drilling and counterboring brake shoes and linings shown in the accompanying drawing. Many variations of the machine are available, some for linings only and others for shoes only.

The FLEXIMATIC system, pioneered by Kingsbury, involves a single base on which is mounted an indexing turret and standard metal cutting units for each operation such as drilling, reaming, counterboring, etc. The turret is designed to receive a number of duplicate work holding fixtures and can be rotated intermittently under control of the operator for presenting fixtures to loading and working stations. While units are in action, the turret is locked securely. All automatic operations are performed simultaneously while the operator removes a finished part and replaces it with a rough part at the loading station.

Speed, accuracy and easy handling even by unskilled operators are inherent in the performance of FLEXIMATICS.

Write today for illustrated Bulletin showing a number of different set-ups

KINGSBURY MACHINE TOOL CORPORATION

KEENE NEW HAMPSHIRE U. S. A.

RUSHING

MUNITIONS

BY AUTOMOTIVE
MASS PRODUCTION
METHODS MEANS
USING CHUCKS BY

JACOBS

THE NATIONAL STANDARD FOR NATIONAL DEFENSE

THE JACOBS MANUFACTURING CO., HARTFORD, CONN.

ALL

ON ACME 'XN' FORGING MACHINES

BEARING SURFACES ARE PRECISION GROUND

WHICH INSURES 3 GREAT ADVANTAGES

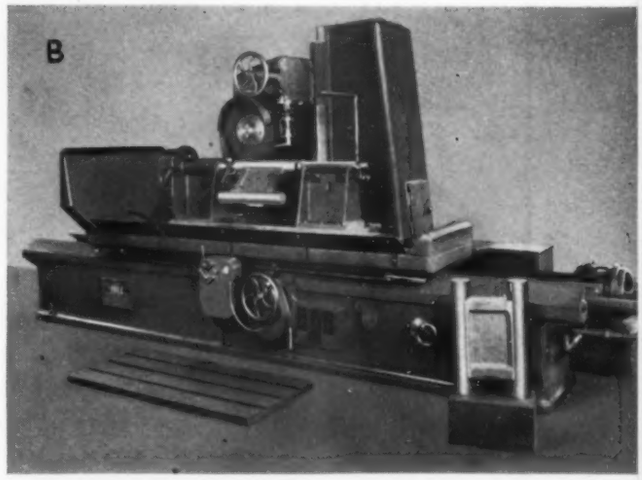
1 Inherent precision **2** Greater forging accuracy **3** Lower maintenance costs

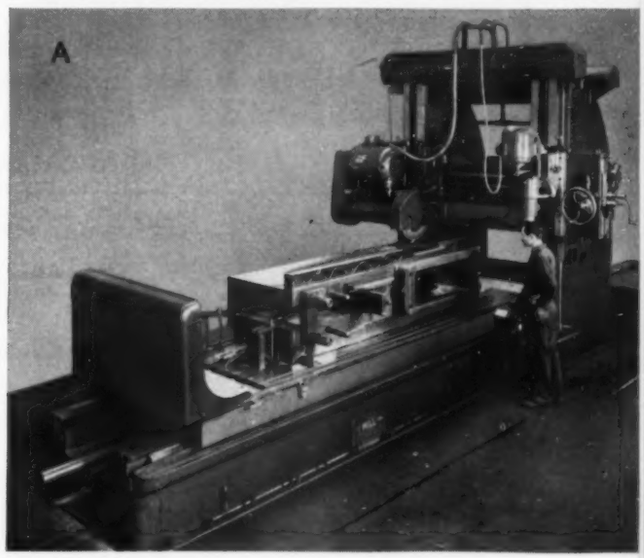
● Exacting requirements of today's industry for closer tolerances in upset forging over long production runs demanded it, *and here it is*—a forging machine in which *every bearing surface is precision ground.* Besides grinding all bearing surfaces of ACME XN forging machine header slides and movable die slides—the toggle slide and toggle links, gibs, tool steel wearing strips and bed caps are ground on "Hill" Open Side Surface Grinders. In addition, the ACME eccentric main shaft is also ground on all bearing surfaces.

The results? Always an accurate, dependable forging machine for over 50 years, the ACME XN is today the finest we have ever built of a long line of high production upset forging machines.

Add to the rugged dependability of ACME design and construction the inherently greater precision that grinding all bearing surfaces insures, and you gain increased forging accuracy and enjoy lower maintenance costs as well, and these advantages are definitely measurable.

Ask for an ACME XN forging machine catalog and specifications—or request an engineer to call, without obligation.





At Left—is shown a 4000 lb. movable die slide for an ACME XN 5-inch forging machine having upper surface ground on the largest "Hill" Precision Surface Grinder ever built. This grinder, built by The Hill Acme Company, has double housings, 100% hydraulic drive, with working capacity of 48-inches between housings and 48-inches under the grinding wheel.

At Right—below (A) is shown this same machine grinding the sides of the 8000 lb. header slide of an ACME XN 5-inch forging machine.

At Right—above (B) is shown a "Hill" Open Side Horizontal Spindle Hydraulic Surface Grinder finishing the toggle links of an ACME XN forging machine.

ACME MACHINERY DIVISION

of THE HILL ACME COMPANY

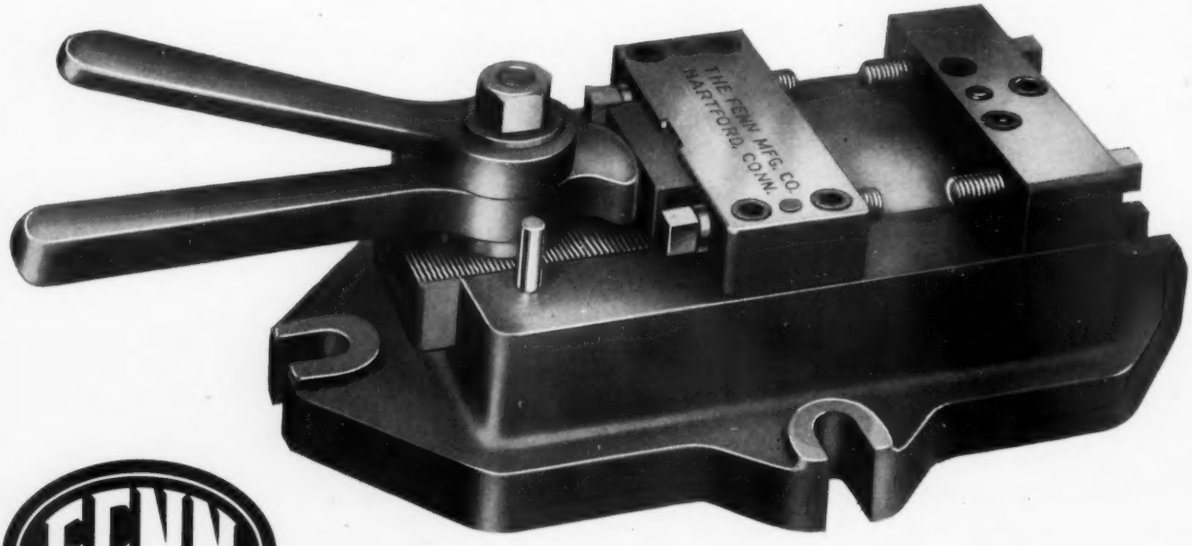
Established 1882

FORGING · THREADING · TAPPING · BOLT · NUT · RIVET MACHINES

4535 ST. CLAIR AVENUE

Cleveland, Ohio

The Fenn Quick Action Vise Speeds up Vital Defense Work



FENN

Made in three sizes: 4"—5"—7"

NO slow hand cranking to close the Fenn vise jaws on the material. For this work-tested, time-saving vise is specially designed to grip a piece of work instantly and hold it securely. The quick action cam lever throws the jaws together as fast as the operator can pull it over; then the Eccentric Handle locks the work in a doubly secure grip.

FENN SPECIAL FEATURES are important to consider. Easily adaptable to many milling, drilling and assembling jobs. Precision built for accurate work. Sliding and stationary jaws precision fitted. All working parts (except base) hardened ground steel. Guaranteed to be exactly as represented. Thousands in use.

SPECIFICATIONS OF FENN *Quick-Action* VISES

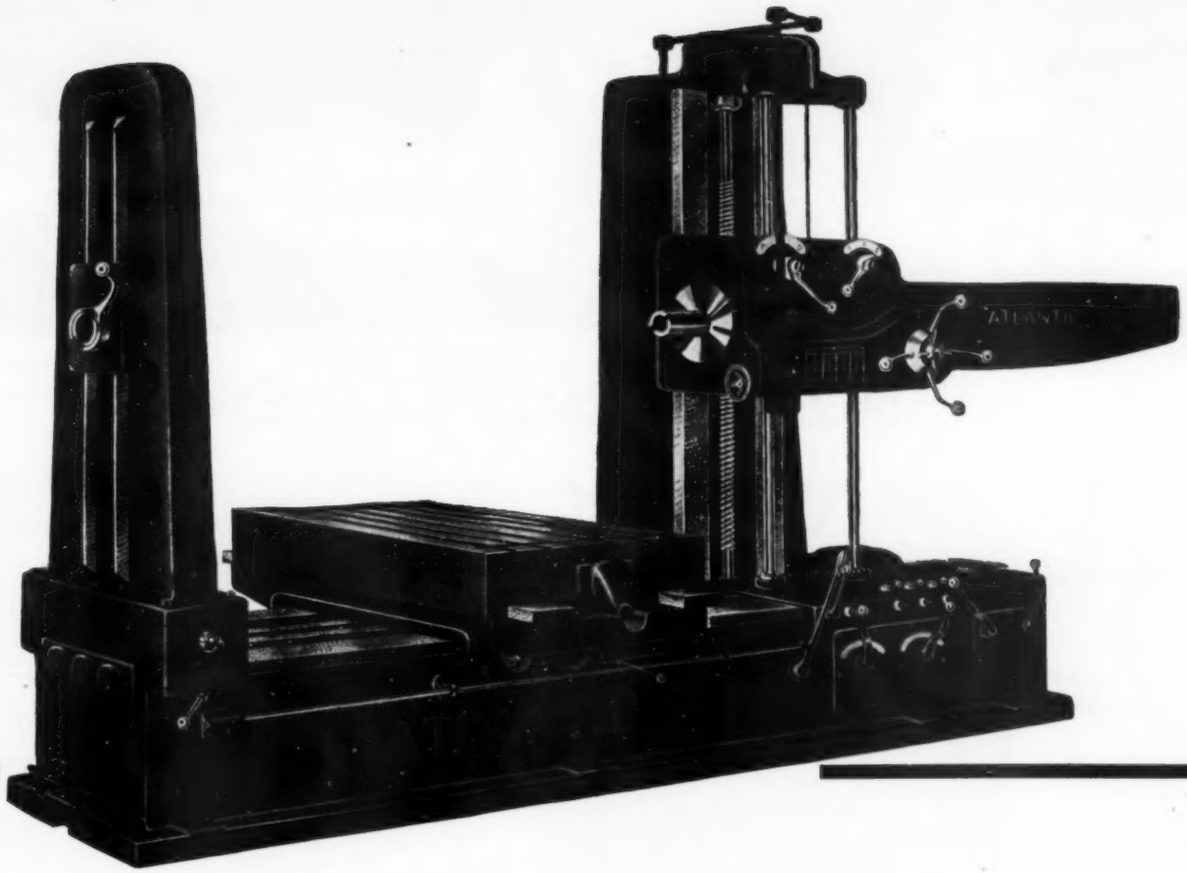
Size of Vise	4"	5"	7"
Length	10"	13"	15¾"
Width	7"	8"	8¼"
Height	4"	4⅜"	6"
Net weight	21 lbs.	35 lbs.	88 lbs.
Shipping weight in carton	26 lbs.	40 lbs.	93 lbs.
Extreme opening without jaws	3¼"	4 1/16"	6 1/16"
Extreme opening with both jaws	⅜" thick jaws 2½"	½" thick jaws 3 1/16"	⅝" thick jaws 5 1/16"
Maximum working opening (grip) without both jaws	2 1/16"	3 1/16"	5 1/16"
Maximum working opening (grip) with both jaws	⅜" thick jaws 1 11/16"	½" thick jaws 2 1/16"	⅝" thick jaws 3 11/16"
Width of key for locating on machines	⅝"	⅝"	⅝"
*Center distance of Bolt Holes	3 1/16"	3¼"	4"

*Bolt Holes can be located as per customer's specifications if standards do not apply.

Send for Descriptive Bulletin No. 10, giving complete information.

Established 1900

THE FENN MANUFACTURING COMPANY, HARTFORD, CONN.



3½"—4"—5" SPINDLE
HEAVY DUTY—PRECISION TYPE

HORIZONTAL BORING MACHINES

Designed for Accurate Work on Armor Plate, Armor Steel Castings and Similar Materials....

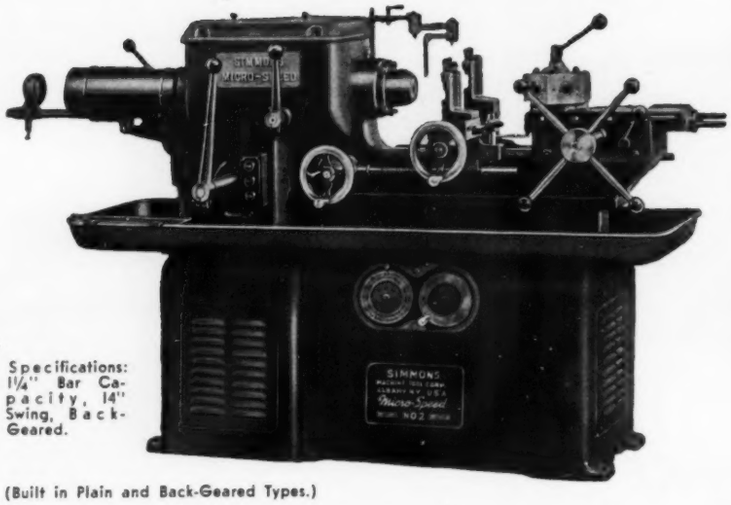
Reasonably Prompt Deliveries

ATLANTIC MACHINERY CORPORATION

149 BROADWAY **NEW YORK, N. Y.**

4 WAYS TO BOOST YOUR

NO. 2 TURRET LATHE



Specifications: 1¼" Bar Capacity, 14" Swing, Back-Geared.

(Built in Plain and Back-Geared Types.)

Simmons No. 2 turret lathe, designed to give you higher precision, is equipped with two features that make it a really outstanding performer.

MICRO-SPEED DRIVE —— for any of 1000 different spindle speeds.

SPINDLE BRAKE AND CLUTCH —— for instant stopping and starting.

The result? The Right Speed for The Job! And that means closer tolerance and faster production.

Standard equipment includes motor-driven coolant pump and spindle brake.

Write for illustrated brochure.

48″ AND 54″ HEAVY DUTY LATHE

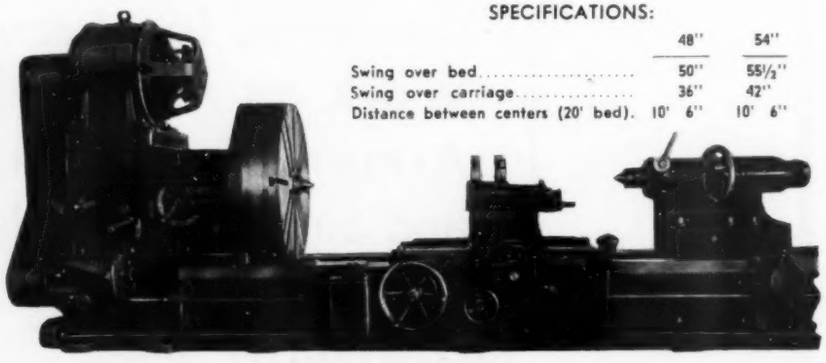
Simmons Heavy Duty Engine Lathe is of exceptionally rugged construction. A long bearing on the bed ways insures adequate rigidity and strength of the headstock. The head is fully enclosed and all bearings and gears are constantly lubricated by positive pressure oil pumps.

This lathe offers nine speed changes which are provided to the main spindle of the headstock through sliding spur tooth gears and one heavy jaw clutch. The boring bar tailstock is designed for boring long holes of large diameter (maximum diameter 8″). Standard carriage, starting carriage, quick change gear box and other extras can be furnished.

Write for illustrated brochure.

SPECIFICATIONS:

	48″	54″
Swing over bed	50″	55½″
Swing over carriage	36″	42″
Distance between centers (20′ bed)	10′ 6″	10′ 6″



SIMMONS

PRODUCTION IN '42

with SIMMONS MACHINE TOOLS

NO. A-1 MILLING MACHINE

Simmons No. A-1 Micro-Speed Milling Machine has been designed for the rapid production of small parts.

The column, of one piece close-grained casting, is suitably proportioned to distribute the necessary strength and rigidity for milling to full capacity. The variable speed unit provides unlimited range of speeds at a turn of the handwheel adjacent to the Selector Dial on the column. Table is designed with large oil pockets and three heavy Tee slots for the entire working surface.

SPECIFICATIONS:

FEED RANGE		SPEEDS
Longitudinal	34"	56 to 630 RPM
Cross	8"	
Vertical	18½"	

Write for illustrated brochure.

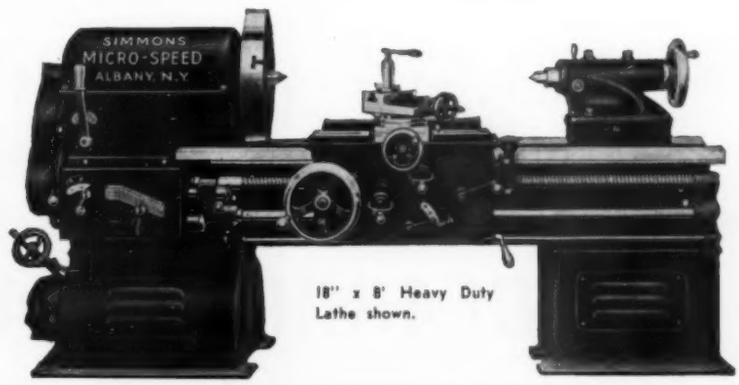
STANDARD AND GAP BED LATHES

Simmons Engine Lathes provide more speed changes than it is possible to obtain in any other geared-head lathe now manufactured. Headstock spindles are equipped with Timken Precision Tapered Roller Bearings.

The Micro-Speed Drive Unit provides an almost unlimited variation of spindle speeds by finger-tip control. Operation is instantaneous, flexible and positive. Lathe bed is of semi-steel. Heavy side walls with double-walled cross girts add to its rigidity.

Manufactured in 16" and 18" standard, 18" and 20" heavy duty, 16"/25", 18"/27", 22"/34" gap bed, 20"/40" and 28"/50" sliding gap bed sizes.

Write for illustrated brochure.

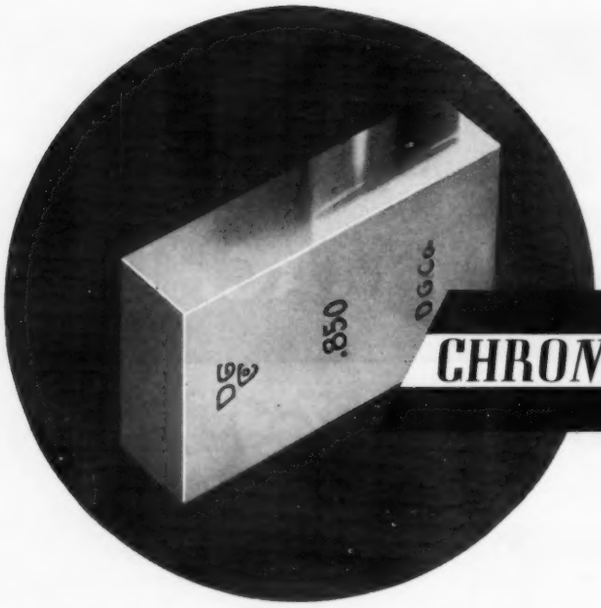


18" x 8' Heavy Duty Lathe shown.

MACHINE TOOL CORP.

1759 North Broadway **Albany, N. Y.**

New York Office: 149 Broadway



CHROMIUM PLATED

20 *times Longer Life*

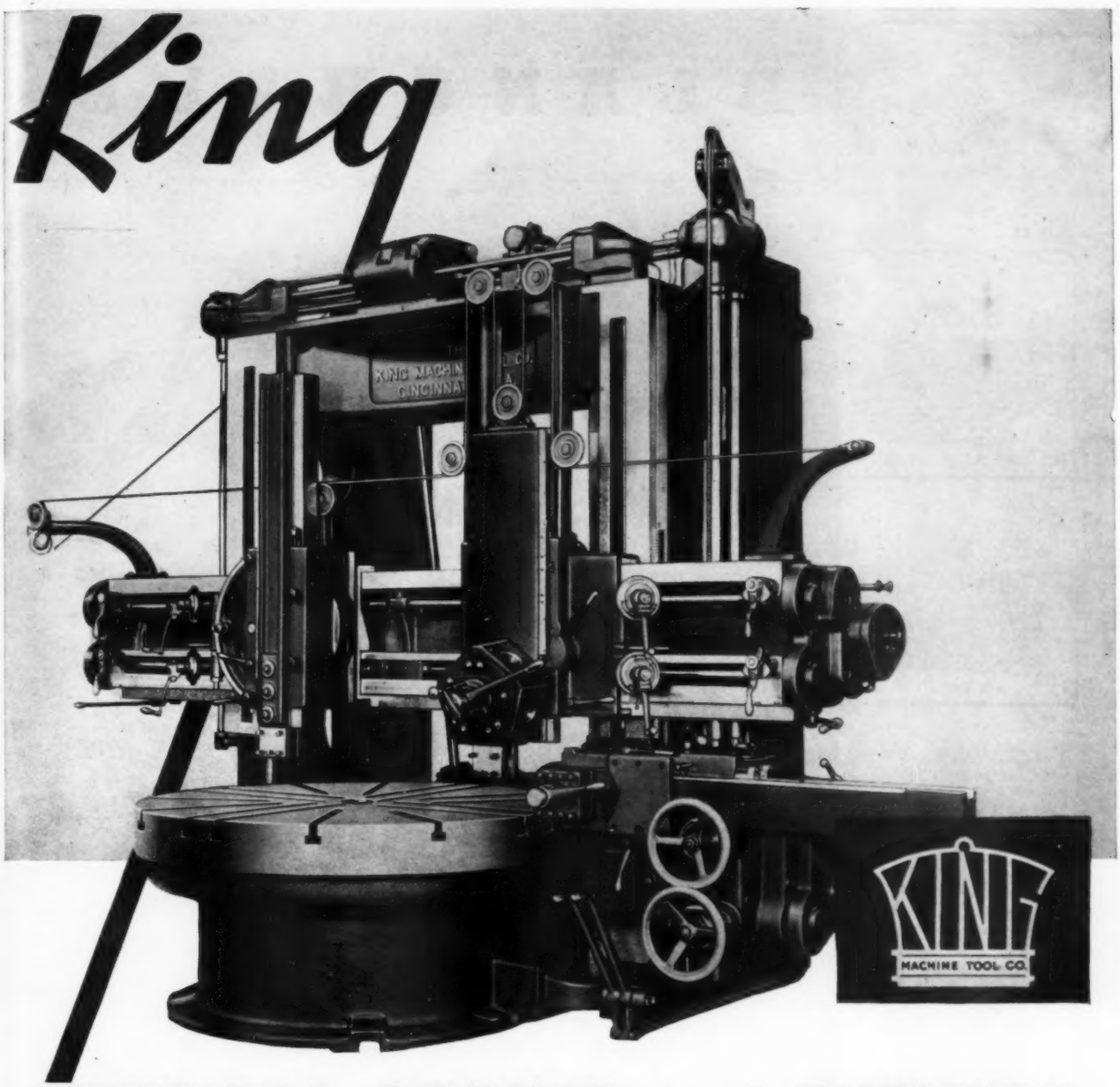
THAN HARD STEEL GAGE BLOCKS

DEARBORN GAGE COMPANY

Originators of Chromium Plated Gage Blocks

22035 BEECH STREET · · DEARBORN, MICHIGAN

King



VERTICAL BORING *and* TURNING MACHINES *exclusively for 41 Years*

For the past 41 years King has devoted its entire time and facilities to improving the design, construction and operation of Vertical Boring and Turning Machines exclusively. Built in single column types from 30" to 42"—double column up to 10 feet.

Timken bearings on all main drive shafts—Sixteen mechanical speed changes range from 3 to 90 R.P.M. Twelve feeds range from 1/96" to 1/2" per revolution table. Power rapid traverse to each head including side head. Power for raising and lowering head is provided by separate motor which supplies power to traverse mechanism. Automatic lubrication to complete drive, table and spindle from reservoir in base.

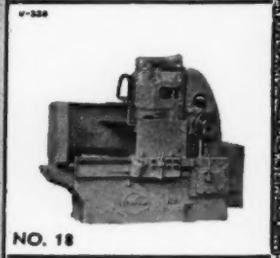
These are a few of the many construction and operating features that make for speed, accuracy and low cost production.

The KING MACHINE TOOL Company

BUILDERS OF VERTICAL BORING AND TURNING MACHINES EXCLUSIVELY

CINCINNATI, OHIO

NO. 11



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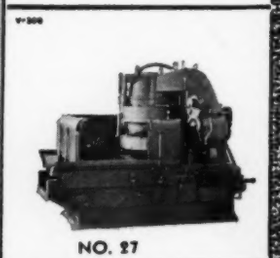

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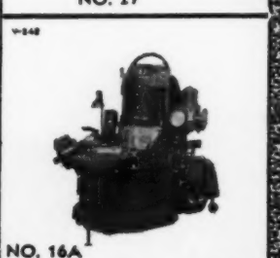

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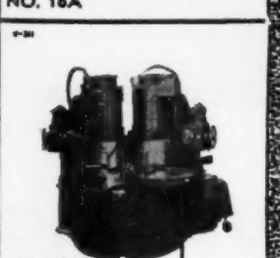

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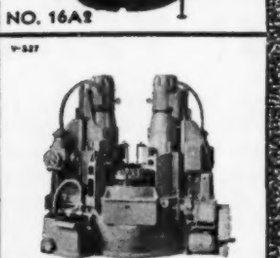


NO. 16A DUAL

BLANCHARD WHEELS

BLANCHARD

Blanchard Surface Grinders are cutting costs and improving quality on both production and tool work

BLANCHARD

THEY are massive, powerful machines with ample weight of metal where it is needed for rigidity. Their controls are convenient and easy to operate. They generate a flat surface by the rotary motions of work and wheel — this makes wheel truing unnecessary and saves cost and time, especially when grinding from the rough.

Since Blanchard Grinders practically eliminate set-up time, the output per machine is high, even with an average operator.

A new development is the production of very fine finishes by Blanchard Grinding. If your work requires flat surfaces with a finish of a few microinches (by profilometer) the No. 11 or No. 18 Blanchard Surface Grinder with fine grit wheel, made by Blanchard, will produce them for you.

To keep Blanchard Grinders at maximum efficiency, it pays to use wheels manufactured by Blanchard.

A General Catalog covering the complete line of Blanchard products, or catalogs on any specific Blanchard product, will be sent on request.

BLANCHARD

THE BLANCHARD MACHINE COMPANY
64 STATE STREET, CAMBRIDGE, MASSACHUSETTS, U. S. A.

Precision Grinding Tapered Threads on Hardened Aircraft Studs (from the solid) on Ex-Cell-O Style 33 Automatic Thread Grinder.

Precision Boring Pistons (to Limits of ±.0002") on Ex-Cell-O Style 215-A Precision Boring Machine (Senior Double End).

Obtaining Smooth, Correctly Shaped Centers on Hardened Parts with Ex-Cell-O Style 74 Precision Lapping Machine.

PRECISION

XLO

EX-CELL-O *means* PRECISION

WHATEVER machining job you're doing today—or will be tomorrow—to help this country win the war that's thrust upon it, it's a thousand to one that *precision* is an absolute requirement. Accuracy and finish in metal cutting work . . . with the highest possible rate of production . . . are now more insistently demanded than ever before. This is why Ex-Cell-O *precision* machine tools are in much greater demand—why they're preferred by prime and subcontractors who are undertaking to produce the millions of metal parts that United States must have without a moment's unnecessary delay. If you want the best—and only with the best can you attain the speed and accuracy now imperative—you'll want Ex-Cell-O *precision* machine tools. They're *precision*-designed, *precision*-built, and give *precision* results . . . because of their superior construction and many automatic features they work so smoothly that operators with just ordinary skill can produce quickly and efficiently with them.

EX-CELL-O PRECISION THREAD GRINDERS
. . . eight styles, covering wide range of work for internal and external threads, giving every manufacturer the choice of the exact type of machine best suited to his specific requirements.

PRECISION BORING MACHINES
. . . pioneer also in development of precision boring as a modern machining process, Ex-Cell-O has designed nine standard machines for boring, facing and turning—machines that handle most of today's precision boring needs.

PRECISION LAPPING MACHINES
. . . fast and accurate lapping of female work centers and internal surfaces is had with the use of Ex-Cell-O Precision Lapping Machines—Style 74 for Center Lapping (illustrated above) and Style 71 Internal Lapping Machine. Both machines are designed and built to Ex-Cell-O's high precision standards of manufacture.

EX-CELL-O CORPORATION • DETROIT, MICHIGAN

THREAD GRINDING, BORING AND LAPPING MACHINES • TOOL GRINDERS • HYDRAULIC POWER UNITS • GRINDING SPINDLES • BROACHES • CUTTING TOOLS • DRILL JIG BUSHINGS

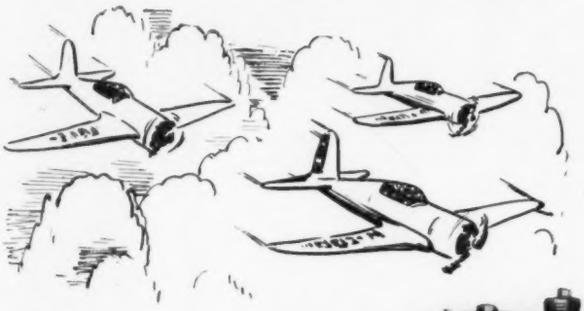
A Battery of

MORRIS

MOR-SPEED RADIALS

HELPS TO

"Keep them Flying"



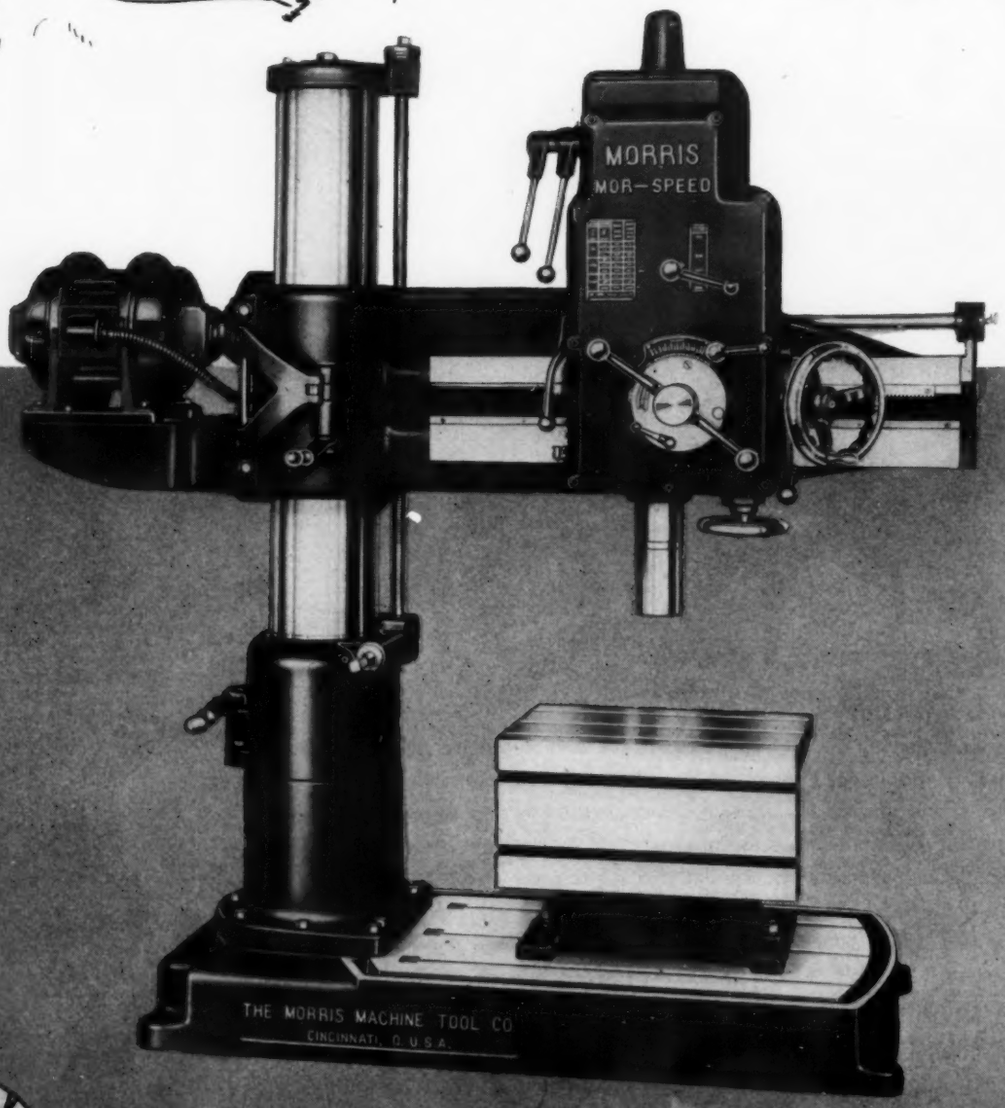
★ One of America's foremost production plants which recently erected a plant specifically devoted to airplane motor production is using a battery of Morris Mor-Speed Radials to help our Air Force "Keep them Flying".

This tribute to the versatility—speed—and accuracy of Morris Mor-Speed Radials is justified by the wide range of work—high production—and close tolerances of the work being produced at this plant.

The New Mor-Speed Radial is adaptable to drilling, boring, counter-sinking, tapping and facing operations. It offers more speed—more automatic stops and trips —more safety devices—better lubrication—more anti-friction bearings at vital points and greater strength, rigidity and balance.

These and numerous other design and construction improvements are yours by merely specifying Morris Mor-Speed for your radial drill jobs.

Bulletin at your suggestion. Write.

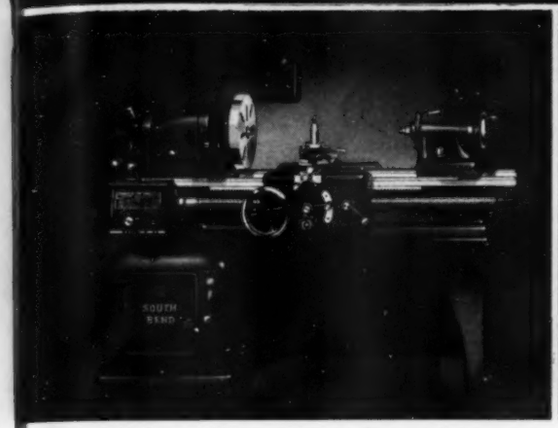


Builders of MOR-SPEED *Radials*

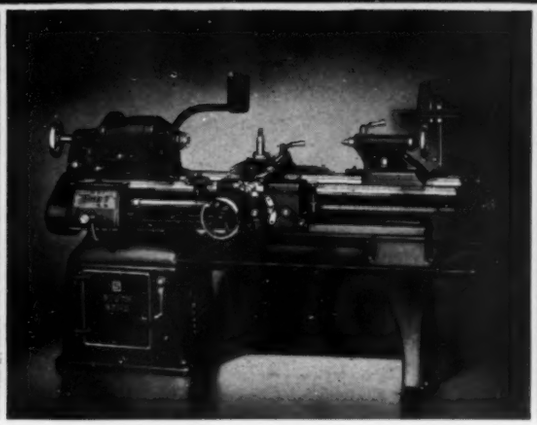
The MORRIS *Machine Tool Co.*

CINCINNATI, OHIO

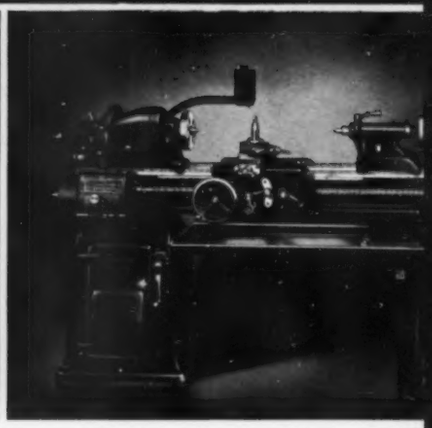
The RIGHT *Lathe For Every Shop Need*



16" swing South Bend Underneath Motor Drive Quick Change Gear Precision Lathe.

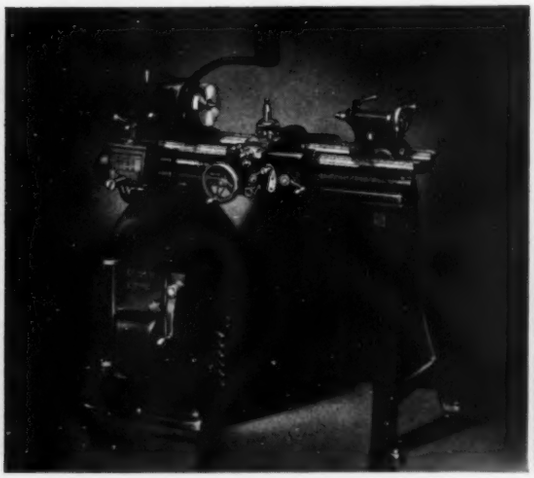


14½" swing South Bend Toolroom Underneath Motor Drive Precision Lathe.



13" swing South Bend Underneath Mo Drive Quick Change Gear Precision La

10" swing 1" Collet South Bend Toolroom Underneath Motor Drive Precision Bench Lathe.



10" swing 11/16" Collet South Bend Underneath Motor Drive Quick Change Gear Precision Lathe.

No. 2-H South Bend Underneath Motor Drive Turret Lathe.

SOUTH BEND LATHE WORKS

LATHE BUILDERS FOR 35 YEARS

287 E. Madison St., South Bend, Ind., U. S. A.

TRADE MARK SOUTH BEND ENGINE LATHES

The True Mea

THE ULTIMATE VALUE of any machine is determined by the extent and quality of the engineering experience underlying its design. Materials and workmanship are wasted if the engineering is unsound.

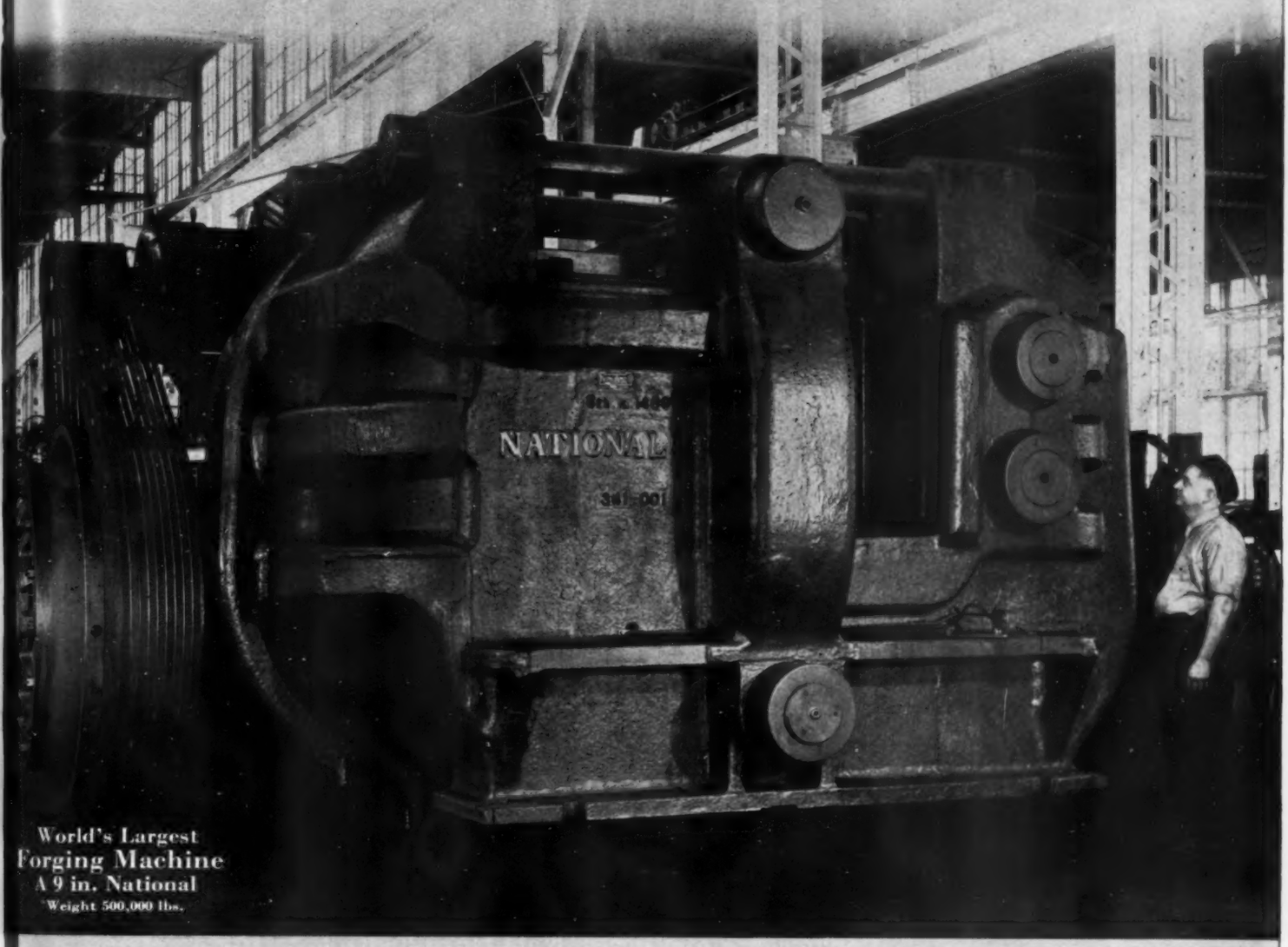
In no other line of equipment is this so evident as in modern forging machinery; and National Engineers, in bringing these machines to their present high state of development, have established an enduring record.

Since they originated the basic features of the modern forging machine, these engineers can and do take full ad-

THE NATIONAL MACHINERY

New York Detroit

ure of Value!



World's Largest
Forging Machine
A 9 in. National
Weight 500,000 lbs.

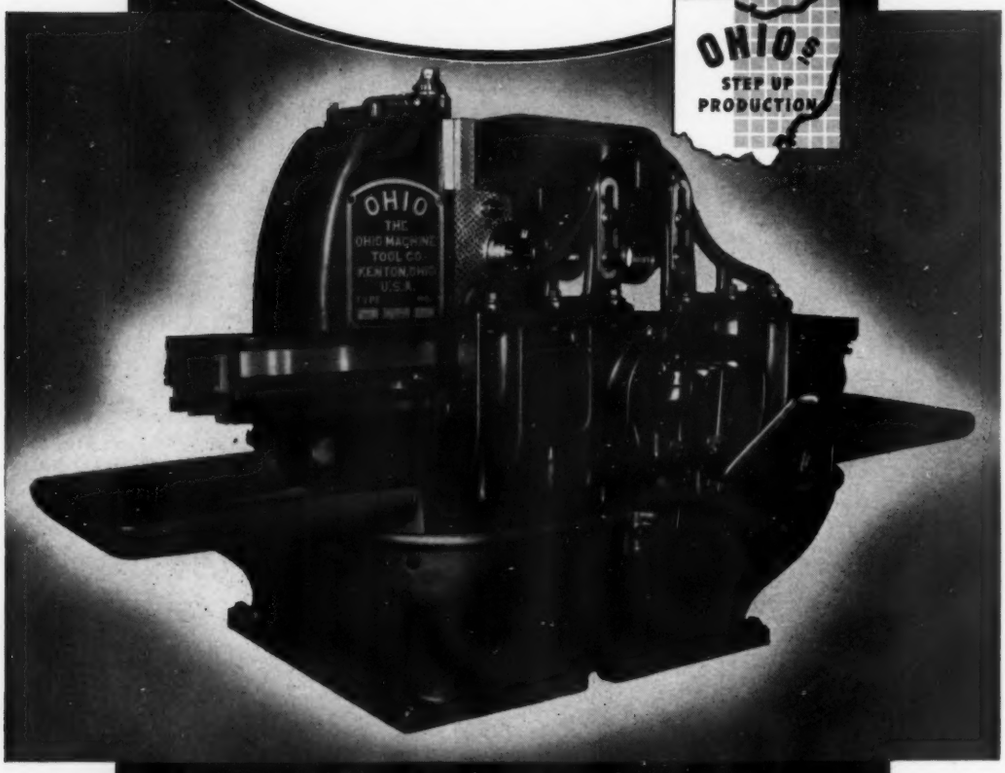
vantage of the opportunity to originate and use new and revolutionary die designs and methods. Consequently, *users of Nationals are producing a vastly wider variety of work, to closer dimensions, and with greatly increased output and much longer die life.*

For Defense or Peace Time Forgings these forging specialists are ready to give you the benefit of their wide experience on die design—throughout the life of your machine.

OMPANY, TIFFIN, OHIO, U.S.A.

Chicago

OHIO PRODUCTION MILLING MACHINES



Convenience and accessibility make the *Ohio Production Milling Machine* rapid in production, yet easy to set up for short runs. Powerful, true cutter rotation, rigidity, a true plane of travel and positive locked feed enable it to mill equally well *with and against the feed*, making possible continuous milling operations without indexing features. Climb-cutting lengthens cutter life. Various cycles of automatic operation of the feed and rapid traverse are available.

THE OHIO MACHINE TOOL COMPANY, KENTON, OHIO

Orders for Ohio Production Milling Machines are being shipped promptly.

OHIO DREADNAUGHT

HORIZONTAL BORING, DRILLING AND MILLING MACHINES • SHAPERS • PLANERS

IT WILL TAKE SPEED-

Whether it's now for rush production, or later for lower costs, speed becomes the most important element in metal turning.

Setting the pace for today's—and tomorrow's—swifter machining, Gisholt Ram Type Turret Lathes provide the fastest lever operated spindle speed control ever developed. The entire range of twelve speeds can be shifted in a few seconds. Or, if you want it still faster, selective automatic speed changing is available.

There's no lag with a coasting spindle when this machine is shifted to neutral. The work piece is stopped quickly by an automatic spindle brake. And you waste no time bringing tools into cutting position with Gisholt's automatic indexing and clamping of the hexagon turret. The operator can complete the whole cycle without taking his hand from the pilot wheel.

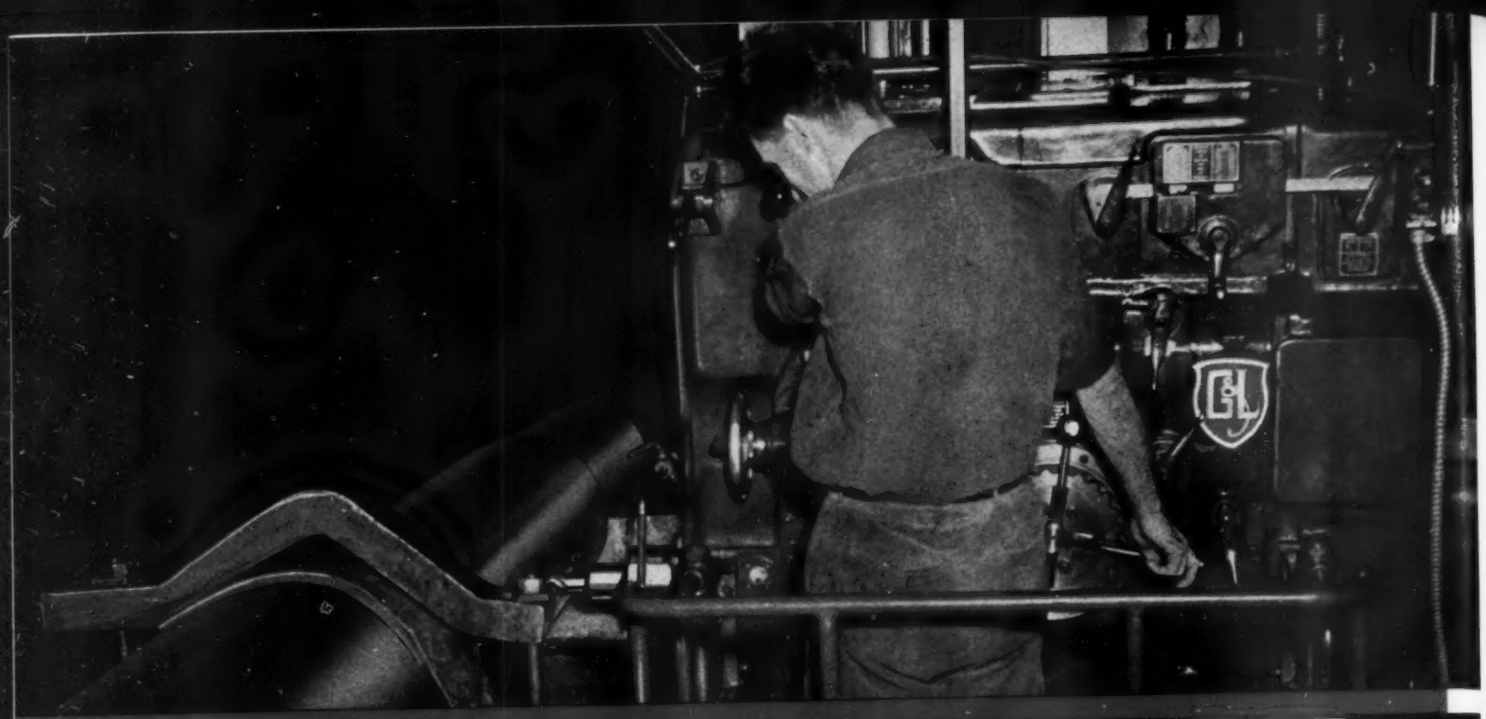
Minutes are vital! To win in war or peace, it will take speed.

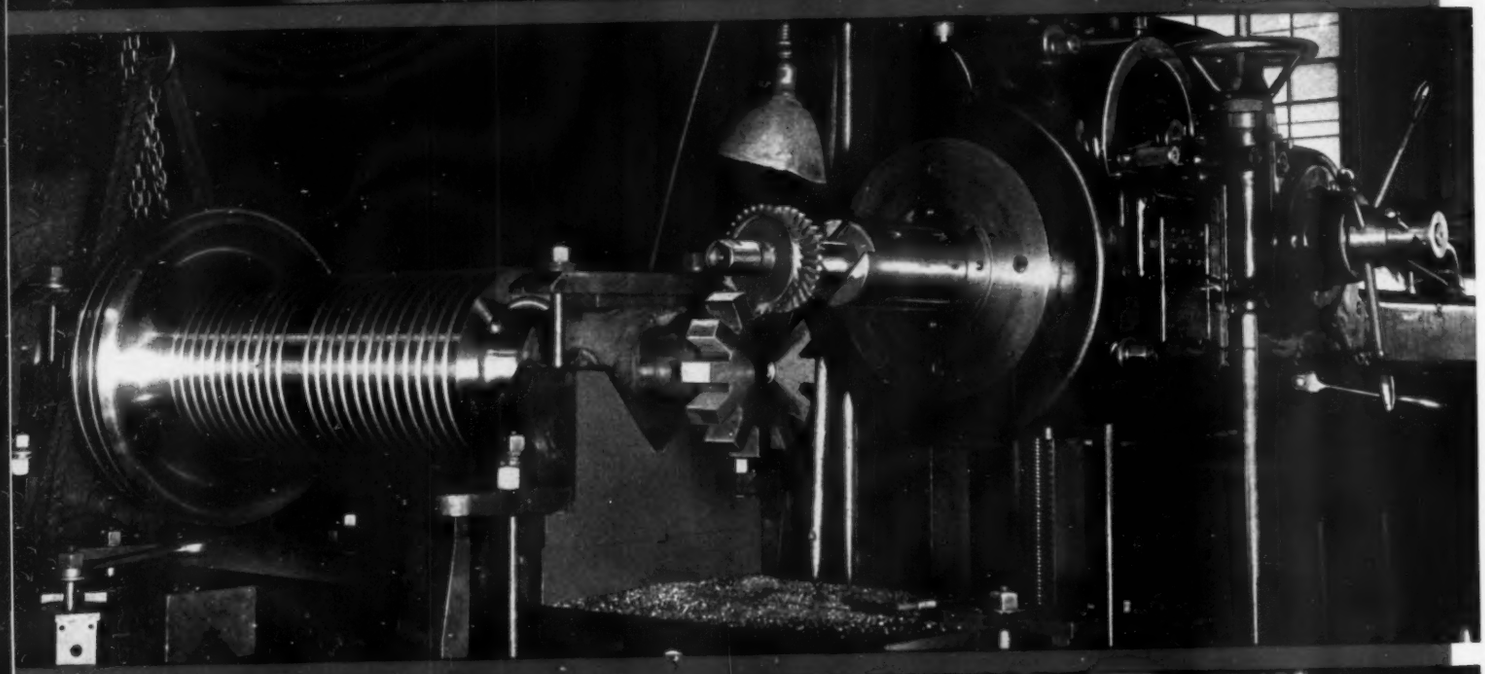
GISHOLT MACHINE COMPAN
1201 Washington Avenue, Madison, Wiscons

GISHOLT

LOOK AHEAD • • • KEEP AHEAD • • • WITH GISHOLT IMPROVEMENTS IN METAL TURNI

TURRET LATHES ★ AUTOMATIC LATHES ★ BALANCING MACHIN





Three Different Shipbuilding Operations

WITH G & L MACHINES

Giddings & Lewis High Power Precision Horizontal Boring, Drilling and Milling Machines fit perfectly into the Navy's Shipbuilding Program; they are used to advantage in practically every yard and plant working on castings, shafts, couplings, etc. The top photograph at the left shows the Giddings & Lewis Machine in the New York Shipbuilding Corp. plant —milling propeller shaft keyways on a tapered section. This calls for extremely close tolerances, and locations exactly 180 degrees apart. The center photograph—from a large nationally known plant—shows another G&L Machine finish milling the jaws for a coupling to a high pressure turbine rotor. This operation is completed in one feed movement of the work past the two cutters, simultaneously milling opposite sides of the jaws. At the Philadelphia Navy Yard is the G&L 350F Machine, shown in the bottom photograph, applied to boring the bearing of a worm gear housing to receive roller bearings. No tolerances are listed for this precision operation—all surfaces must be as close as possible to blueprint dimensions.

Giddings & Lewis Machines are all precision-built to produce to extremely close limits of accuracy—with modern speed, convenience and economy. Data on floor, table, planer and multiple head types of G&L Machines will be sent upon request.

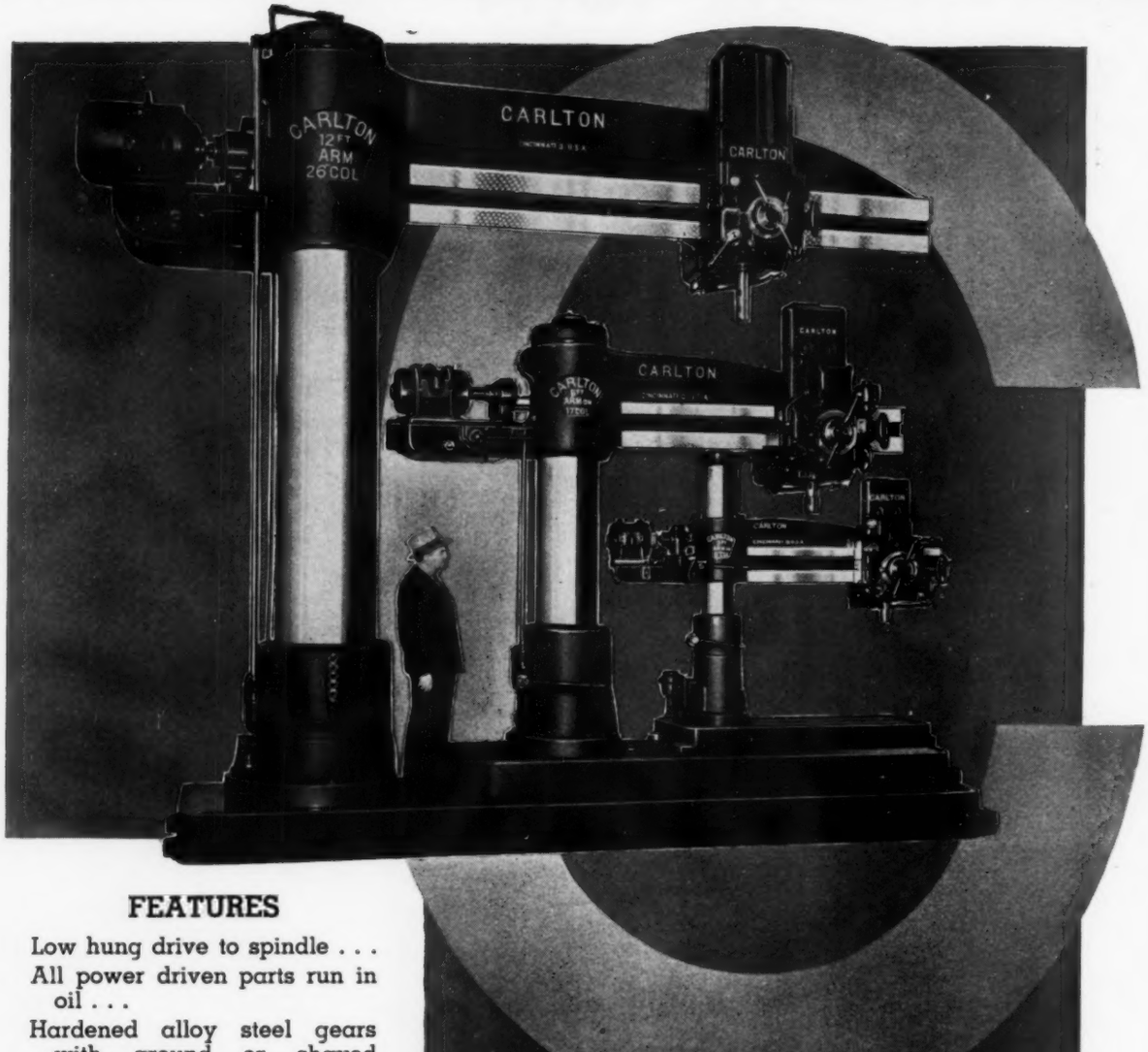
THE GIDDINGS & LEWIS MACHINE TOOL COMPANY
Fond du Lac, Wisconsin

GIDDINGS & LEWIS

High Power Precision

HORIZONTAL BORING, DRILLING AND MILLING MACHINES

CARLTON *Radial Drills*



FEATURES

Low hung drive to spindle . . .
All power driven parts run in oil . . .
Hardened alloy steel gears with ground or shaved teeth . . .
Unit construction . . .
Anti-friction bearings throughout . . .
Concentrated, convenient control . . .
Ball bearing head rolling on a hardened and ground steel armway . . .
Quiet running at all speeds . . .
Oil filtered.

Designers and builders of Radial Drills exclusively for over 25 years Carlton offers all the modern developments in electric control and simplified operation for those desiring the "last word" in Radial Drills. Built in sizes 9 inch to 26 inch columns and 3 foot to 12 foot arms.

The CARLTON MACHINE TOOL CO.
CINCINNATI OHIO, U.S.A.

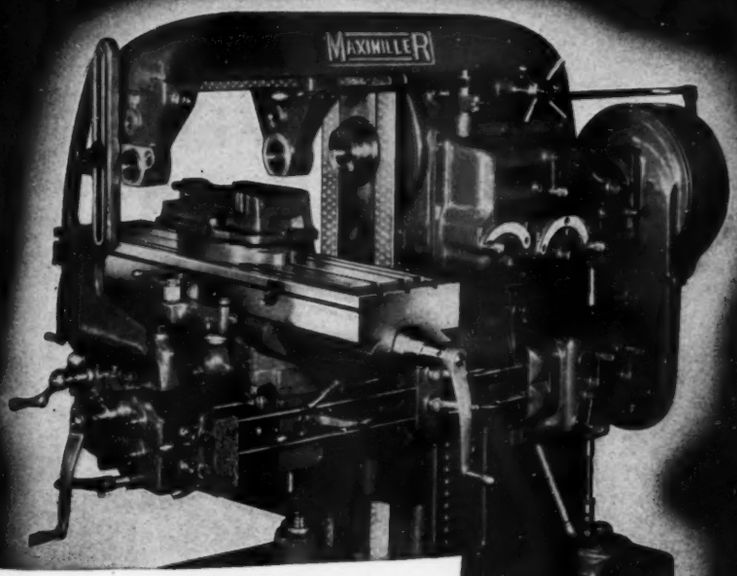
KEMPSMITH *Since* 1888

For 54 Years the By-word for *Milling Machines:* KEMPSMITH

Since 1888, KEMPSMITH has been a world-wide by-word for America's supremacy in Milling Machines. KEMPSMITH *matured* experience now looms soundly on the national horizon for industry, in terms of speeding deliveries of vital machine tools for Defense production. Veterans of traditional KEMPSMITH precision methods . . . men who know what industry demands in modern high-speed milling machine performance . . . now assure precision CONTROL of every detail of materials and workmanship.

Frank Kempsmith
FOUNDER

KEMPSMITH *Today & "Tomorrow"*



Today, in a modern plant, flexible for "production type" or special machines, KEMPSMITH operates on steady 3-shift schedules. "Tomorrow", when Peacetime adjustments come, this flexible KEMPSMITH plant will be in ideal position to swing over, efficiently, to industry's post-war needs... in support of industry's faith that KEMPSMITH will be prepared then, as now, to work with you, for the good of industry and the nation.

Rugged **KEMPSMITH MAXIMILLERS,** with reliable accuracy and extra power for heavy, continuous cuts on long production runs, in Horizontal (Plain or Universal) and Vertical types . . . KEMPSMITH Type G Geared-Head Milling Machines for Tool Room work and lighter production—also Dividing Heads; Heavy Duty Vertical Attachments; High Speed Universal Attachments; Slotting Attachments; Vises; Arbors; Rotary Tables; etc.

KEMPSMITH MAXIMILLER

AVAILABLE IN VERTICAL OR HORIZONTAL TYPES • PLAIN OR UNIVERSAL

1903 1908 1913 1918 1923 1928 1933 1938 1941

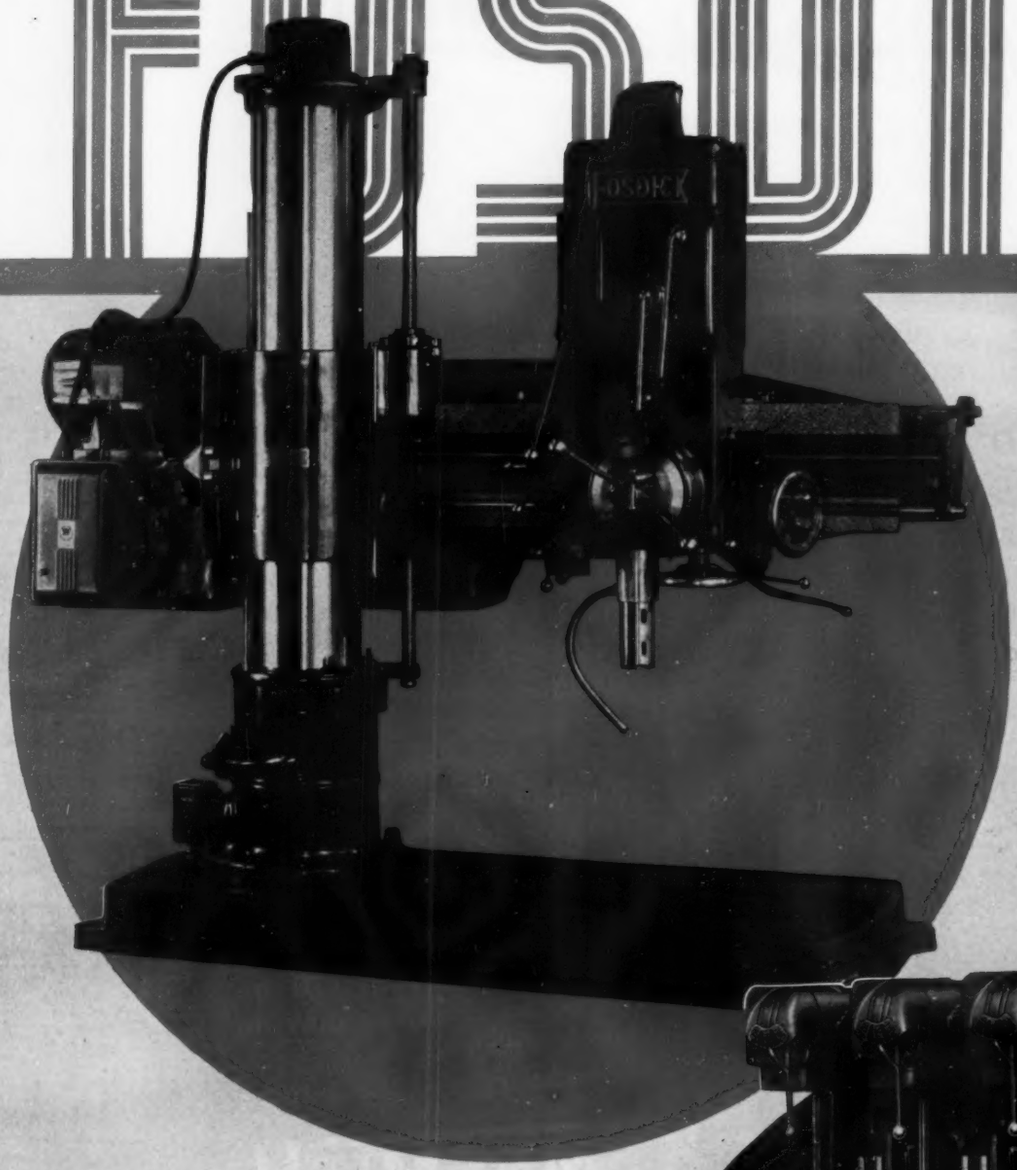
PRECISION

MILLING MACHINERY *Experience*

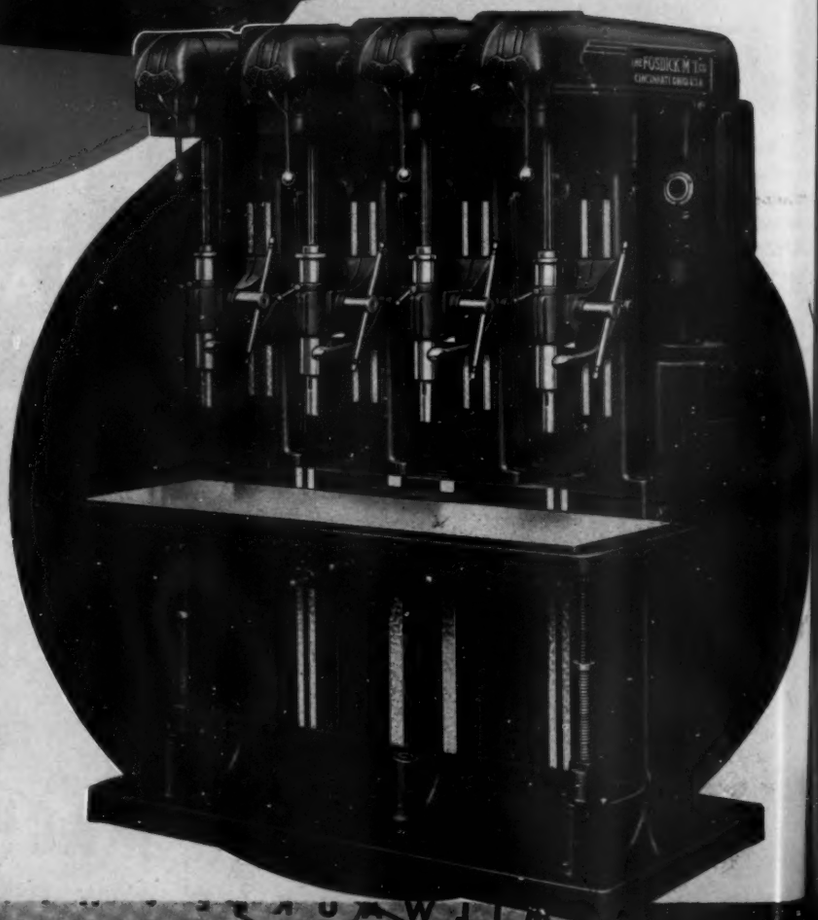
KEMPSMITH MACHINE CO.

MILWAUKEE • WISCONSIN

FOSDICK



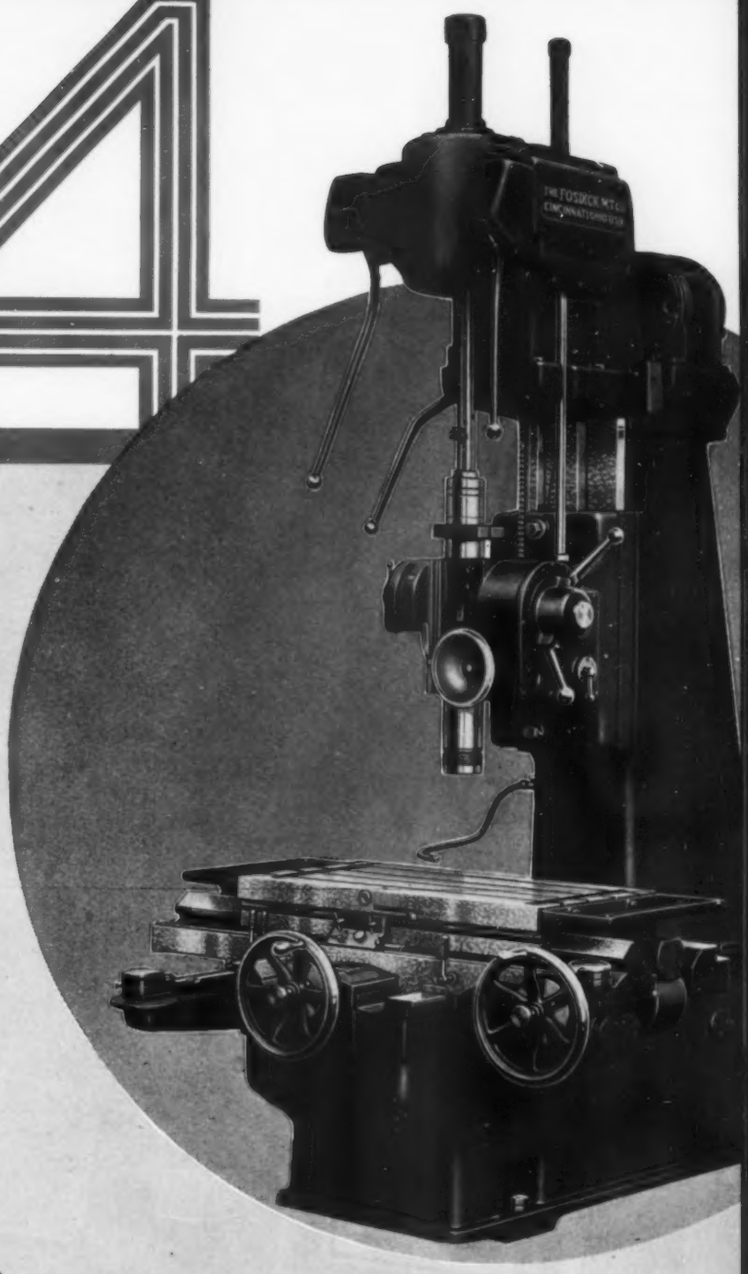
RADIALS
JIG BORERS
SENSITIVE &
SUPERSPEED
DRILLS



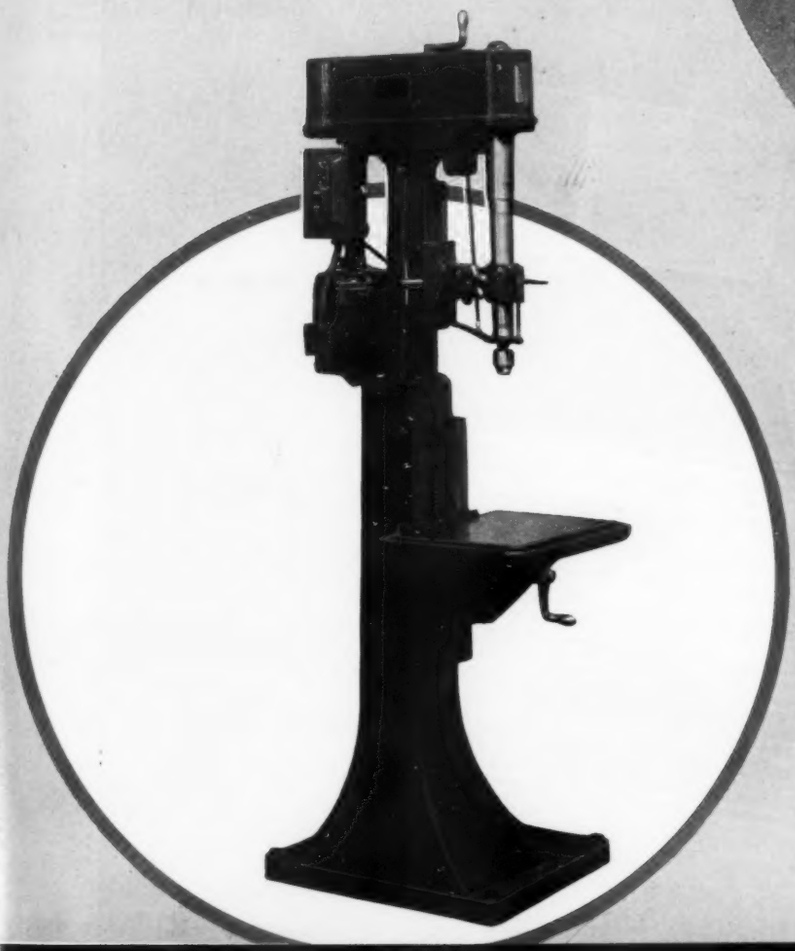
Above **— FOSDICK ECONOMAX RADIAL DRILL.** Built in 6 sizes—3 foot—4 foot—5 foot—6 foot —7 foot and 8 foot. Featuring Hydraulic Column Clamp—Hydraulic Arm Clamp interlocked with single lever control for unclamping, raising and lowering arm—Hydraulic variable rapid traverse—thirty-six spindle speeds—eighteen feeds—anti-friction bearings throughout—tap feed lever interlocked with high speed of spindle—adjustable spring counterbalance—spindle safety — all controls mounted on head—all multiple disc clutches adjustable from outside.

Right**—FOSDICK HIGH SPEED SENSITIVE DRILLS** are built in capacities from 1" to 1½" diameter and with any number of spindles up to 6. Furnished with either power or hand feed with reversing motor tapping—with 6—9—12 or 18 speeds from very low to extremely high spindle speeds. Spindles are of high carbon steel, multi-splined and accurately ground. Precision angular contact thrust bearings are provided for the bottom of the spindles and deep groove row bearings at top of spindles.

Big 4



• This line of machines covers an extremely wide range of drilling, reaming, boring and tapping operations on a particularly wide variety of work. From Tool Room to production line you will find a Fosdick Machine Tool capable of handling your work quickly—accurately—economically. Bulletins giving complete details furnished upon request. Write.

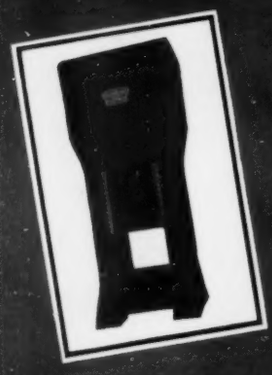


***Above*—FOSDICK JIG BORERS** are designed for production of close tolerance work such as required of tool ro operation and for the accurate production of small lot jobs wh jig or fixture costs are prohibitive. Initial cost is comparativ low. Machine is simple in operation—does not require hig skilled help—and is adaptable to a wide range of drillin boring—counterboring—and tapping operations. Spindle spe from 60 to 1500 RPM. Spindle feeds .0012" to .010". Built two sizes No. 30—Table 18"x36" and No. 30A—Table 22"x4 Spindle travel 9". Distance column center of spindle 15 Above specifications common to both machines.

***Left*—FOSDICK SUPERSPEED BALL BEARIN SENSITIVE DRILLS** take 0 to ⅜" drills, and are built combinations of 1 to 6 spindles. Available in bench and p estal types. Spindle speeds—715 for ⅜ drilling, to 12,0 These units are built for production in accordance with latest drilling practice. They're *safe* . . . all revolving pa except chuck are enclosed—*saving* . . . all parts give long-liv service—*guaranteed* . . . rigorous inspection, plus exacting wo manship, assures satisfaction. Motors—½ H.P. for single spin to 1½ H.P. for 6 spindle are recommended. A sterling exam of Fosdick established manufacturing methods ideal for v time production.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI . . . OHIO

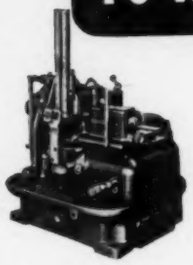
MODERN PRODUCTION Calls for MODERN PRESSES



This series of Modern Cleveland Presses embraces three types known as Single Point, Two Point and Four Point and each type can be furnished in sizes and capacities to suit requirements.
The Four Point, shown above, has 18" stroke, 90" x 136" Bed Area and a capacity of 300 tons.
The Two Point, lower insert, has 24" stroke, 60" x 136" Bed Area and a capacity of 350 tons.
The Single Point, upper insert, has 12" stroke, 36" between uprights and a capacity of 250 tons.
The gearing and drive are located in the box type crown and there are no overhanging projections.

Modern Presses THE CLEVELAND PUNCH & SHEAR WORKS COMPANY *Cleveland, Ohio*
NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • PITTSBURGH

What BARBER-COLMAN MEANS TO ACCURATE HIGH PRODUCTION *In '42*



TYPE S Automatic Hobbing Machine — For production of small precision gears up to 1" diameter x ½" face and 200 D.P.

No. 3 Standard Hobbing Machine — Capacity: 5" dia. x 7" face. 12 Pitch and finer. Built also in Precision Type.

TYPE V Vertical Hobbing Machine — For high production and greater accuracy on work up to 8" dia. x 9" face; 4 Pitch and finer; saves floor space.

LONG a leader in developing tools for accurate high production, Barber-Colman has figured importantly in preparing thousands of plants for peak output during 1942 and "the duration". B-C Hobbing Machines, Sharpening Machines, Hobs, Cutters, and Reamers are of highest quality and show consistent records of superior performance. They are being produced in a steadily increasing flow to expand manufacturing capacity, to reduce machining costs, and to speed production with increased accuracy.

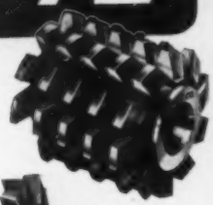
HOBBING MACHINES — Offering the latest advantages for hobbing precision small gears, spur or spiral gears, worms, splines and various related forms, B-C Hobbing Machines are fast, accurate, and easy to operate. They are built in the six types illustrated, ranging in maximum capacities from 1" dia. x ½" face to 14" x 14".

HOBS — B-C Ground Hobs are standard for precision work, fine finish and high productive accuracy. B-C Unground Hobs provide similar excellent results on commercial work, with low tool cost.

MILLING CUTTERS AND REAMERS — The same expert engineering, skilled workmanship, and advanced manufacturing methods which produce B-C Hobs, also make B-C Cutters and Reamers outstanding for accuracy, long life, and low tool cost. The extensive line of *B-C Cutters* includes plain, helical and side milling cutters, form relieved cutters, and a great variety of other standard and special types. Deserving special mention among these is the distinctive "Paraform" tooth design, for combined strength and free cutting action. *B-C Fluted* and *Inserted Blade Reamers* have unique features which insure smooth cutting action and superior finish. Wide selection includes adjustable expansion reamers, line reamers and various special mountings.

SHARPENING MACHINES — Correct sharpening with controlled accuracy is made easy on B-C Hob and Cutter Sharpening Machines. The *No. 3* and *No. 4 Automatic Sharpening Machines* sharpen hobs and formed cutters with straight or spiral gashes. The *Combination Hob, Cutter and Reamer Sharpening Machine* sharpens tools with straight gashes as well as high helix. *B-C Automatic Reamer Sharpener* is designed for sharpening B-C Reamers exclusively.

ENGINEERING SERVICE — Barber-Colman Hob and Cutter Engineers have solved many different machining problems as a result of their long experience in the application and design of hobbing equipment and special tools. Why not consult them whenever you have similar problems involving accuracy, higher production or lower tool costs. There is no obligation, just send complete information and detailed part print or request our representative to call.

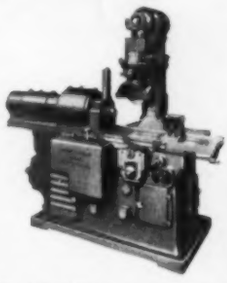


HOBS — Ground and Unground, Standard and Special.

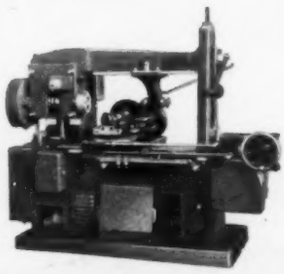
MILLING CUTTERS — "Paraform" Design; Formed, Standard and Special.

REAMERS — Fluted, Inserted Blade, and "Pinwedge" Expansible Reamers.

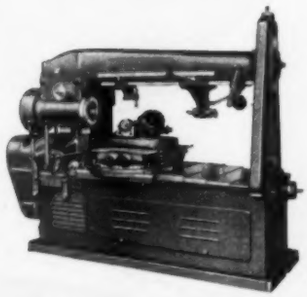
COMBINATION Sharpening Machine — Sharpens hobs, cutters and reamers; straight gashed up to 24" stroke; or maximum 30° helix with 8" stroke.



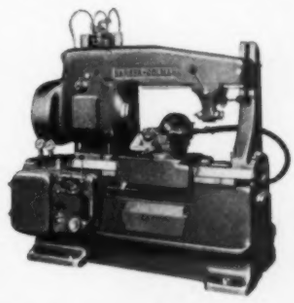
No. 3 and No. 4 Automatic Hob Sharpening Machines for hobs and formed cutters. Capacities: No. 3 — 4" dia. x 4" face, No. 4 — up to 10" dia. x 12" face.



TYPE A Hobbing Machine — A rigid, accurate machine for general purpose or production hobbing. Capacity: 12" dia. x 12" face. 4 Pitch and finer.



TYPE T Taper Spline Hobbing Machine — May be used also on general hobbing work within its capacity. Spur and spiral gears, straight and involute splines, etc., may be hobbed.



TYPE D Hobbing Machine — A heavy duty high production machine powered hydraulically. Capacity: 14" dia. x 14" face. 3 Pitch and finer.

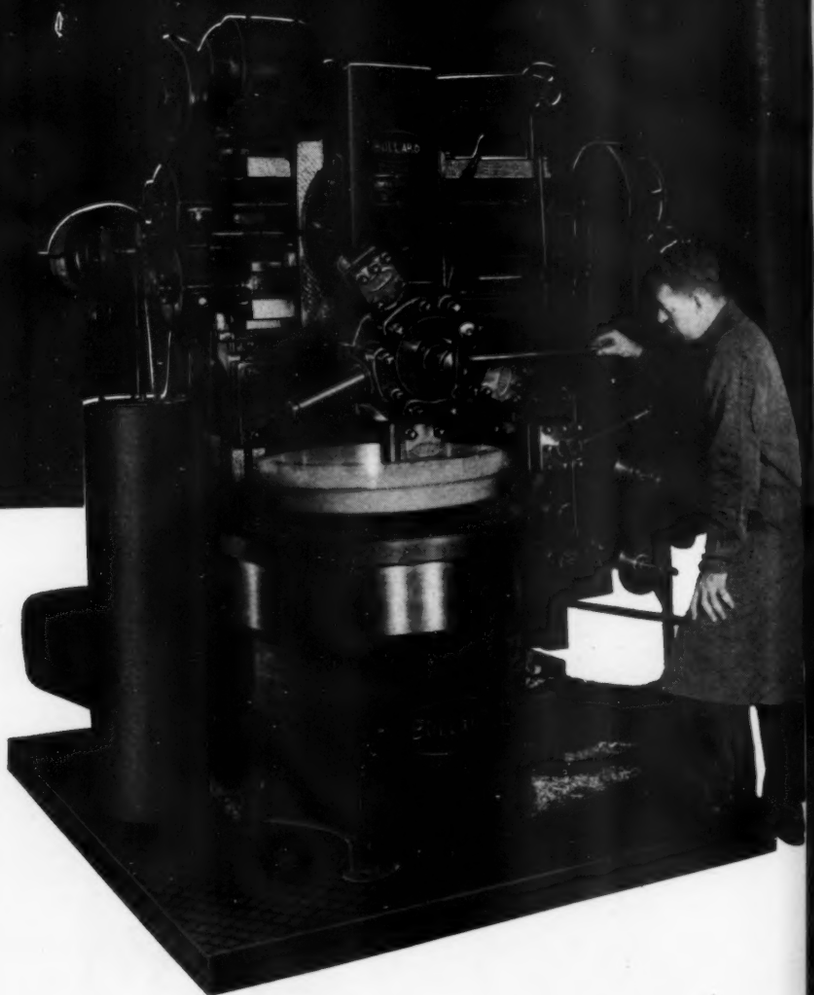
BARBER B-C COLMAN PRODUCTS

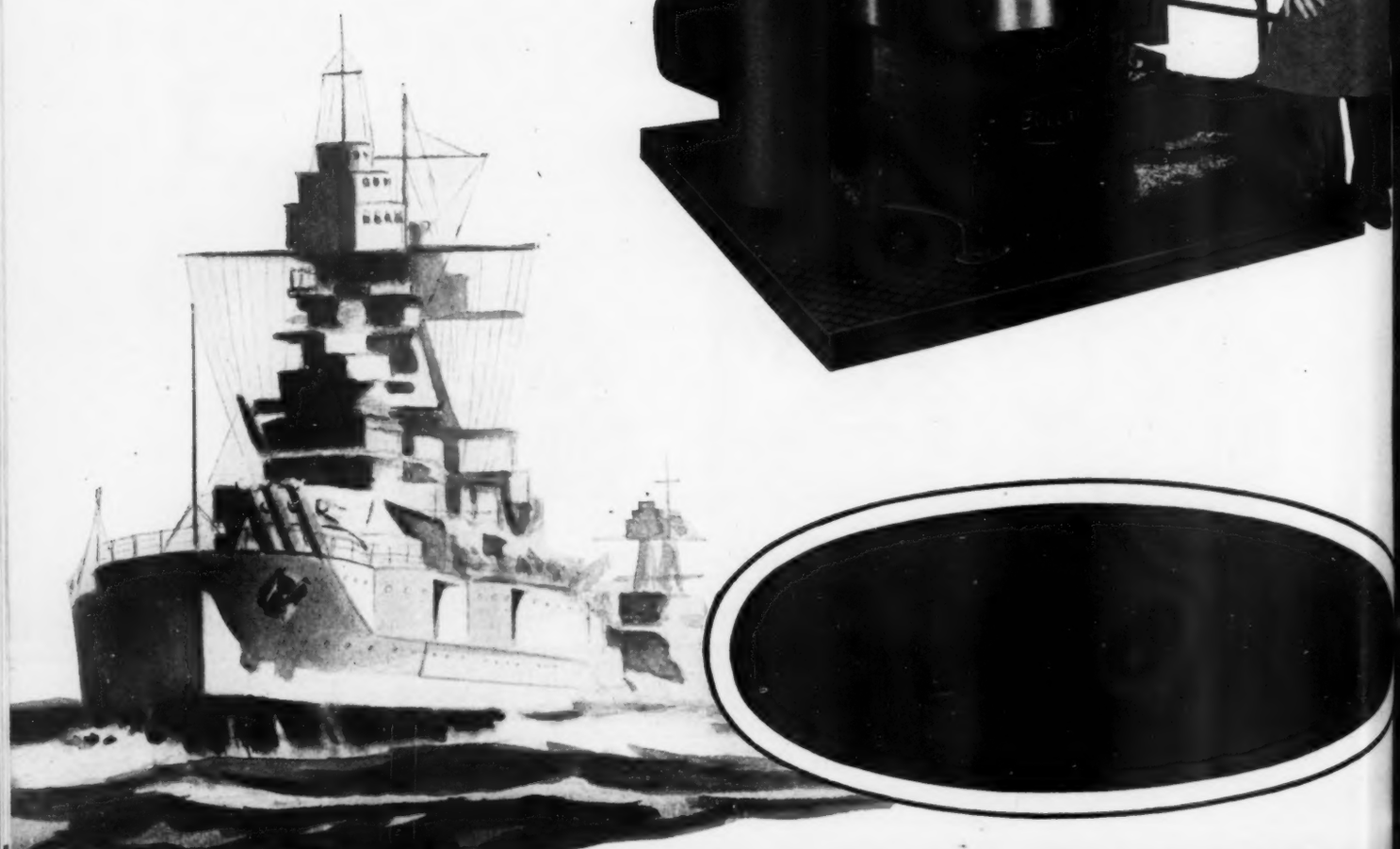
HOBS, HOBBING MACHINES, HOB SHARPENING MACHINES, REAMERS, REAMER SHARPENING MACHINES, MILLING CUTTERS, SPECIAL TOOLS

Barber-Colman Company

General Offices and Plant 201 Loomis St., Rockford, Illinois, U. S. A.

On The Sea...





In The Air...

Hundreds of Multi-Matic machines are working day and night on airplane engine cylinders throughout the United States, machining cylinders, crankcases, propeller hubs and other parts—turning out products of unprecedented accuracy and unprecedented speeds. Multi-Matics are also vital tools in the struggle of industry generally to

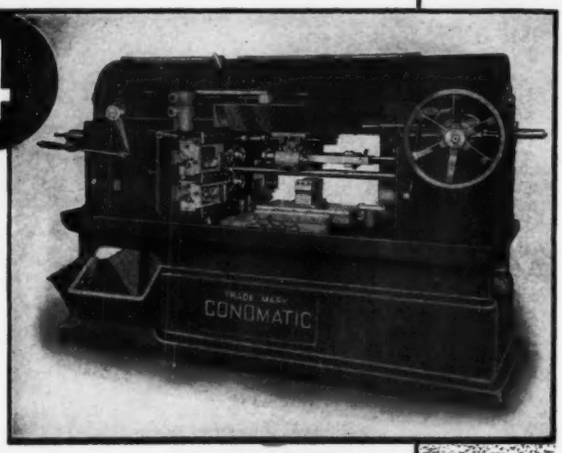
THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

CONOMATIC SCREW MACHINES

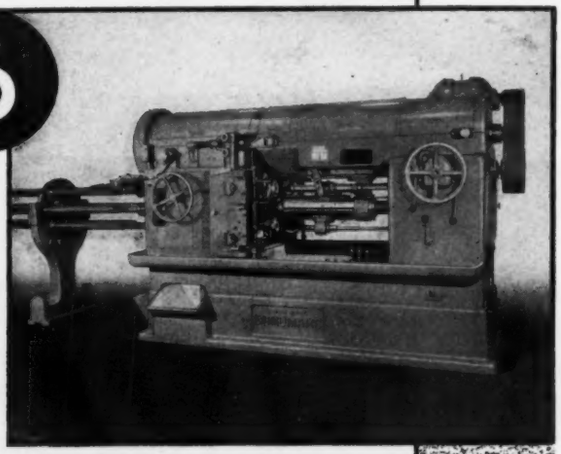
ECONOMY

4



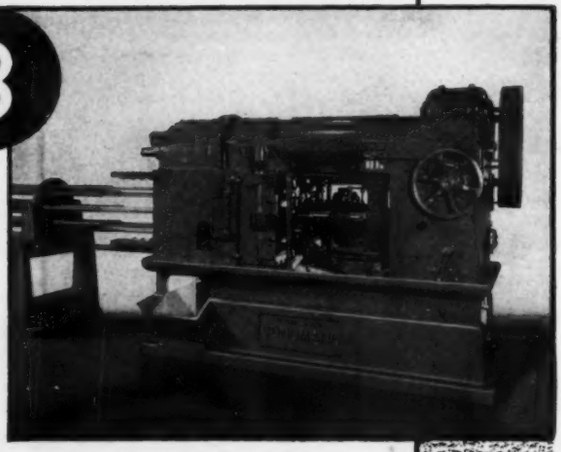
ACCURACY

6



PRODUCTION

8



PROFITS

CONOMATICS are built with 4, 6 and 8 spindles to cover the complete demands of those manufacturers who want to streamline their production to the point where profits are assured.

Parts may be produced from bars up to 6 inches in diameter with a milling length of 7 inches. The Cone policy of exceptionally rigid construction permits taking unusually heavy forming cuts at maximum speeds and feeds. This, together with rigid slides, accessible tooling, cams out of the way, individual forming slides, and individual positive forming stops, are but a few of many profitable CONOMATIC features. Your inquiries on machines and time studies will incur no obligation.

SEND FOR YOUR FREE COPIES OF THE NEW CONOMATIC CATALOGUES

CONE AUTOMATIC MACHINE COMPANY, INC.
WINDSOR, VERMONT

UNION

The Tools You Buy Again

Tools must be chosen with care for the jobs they have to do in tank, gun and plane manufacture, in shipbuilding and hundreds of other vital defense jobs.

Every Union tool is a precision tool, built to exact standards of ruggedness and accuracy, capable of sustained high production and lasting precision.

Choose them with confidence. We are sure that, on the toughest defense jobs, their performance will make them The Tools You Buy Again.

IVISIONS of the UNION TWIST DRILL COMPANY

UNION
BUTTERFIELD
S. W. CARD

OUR 68th YEAR OF SERVICE

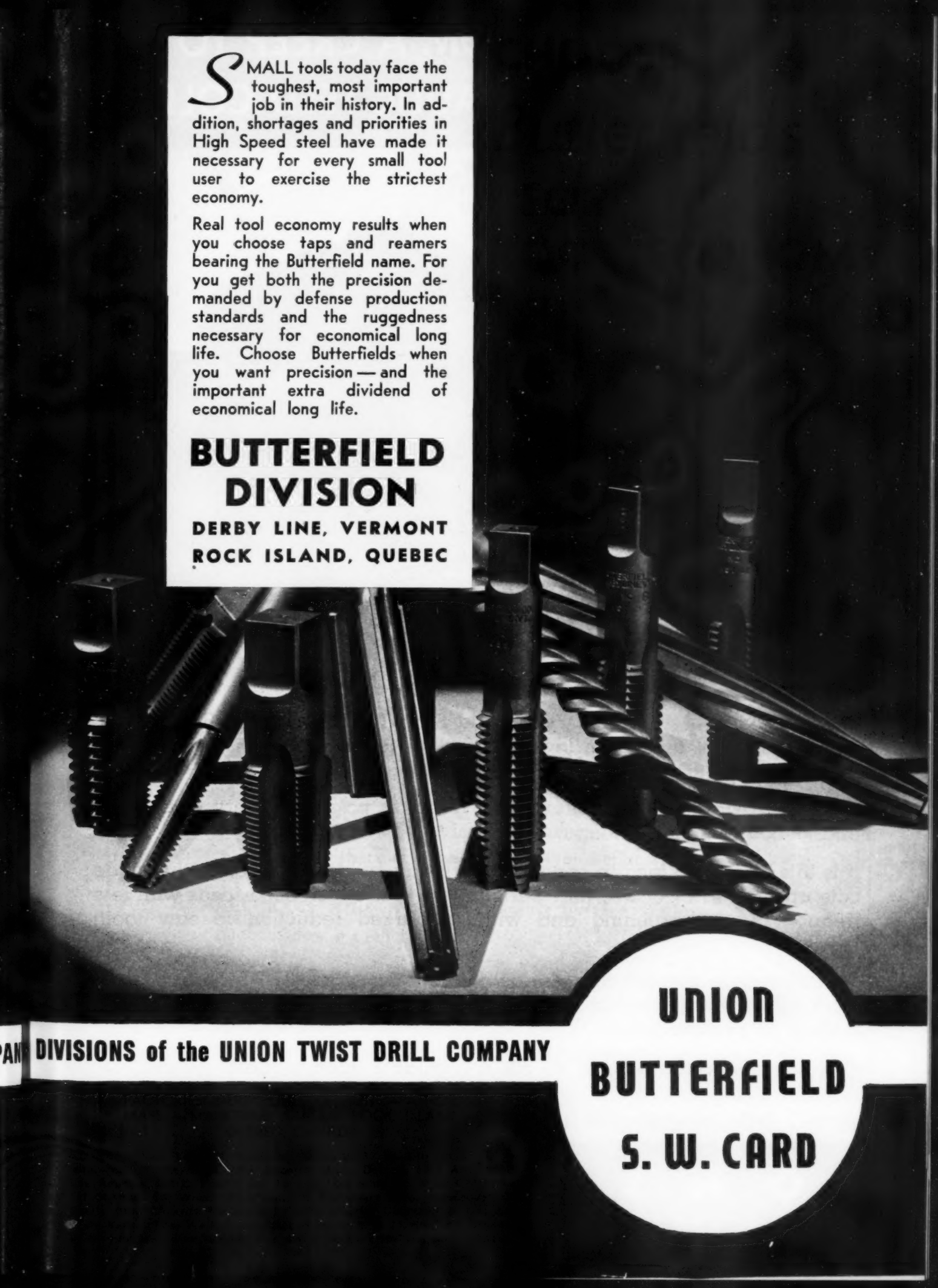
Since 1874, Card has studied the problems of efficient threading. Today, with defense jobs demanding high accuracy and continuous operation at high speeds, our 68 years of experience becomes an invaluable asset. Let us study your problems and make suggestions on preliminary drilling, thread depth, lubrication, cutting speeds, tap grinding and all the fine points of tapping that will enable you to get the BEST service from Card Taps on every 1942 tapping job.

S. W. CARD MFG. CO.
MANSFIELD MASS.

QUALITY TAPS Since 1874

UNION
BUTTERFIELD
S. W. CARD

DIVISIONS of the UNION TWIST DRILL COMPAN DIVI



SMALL tools today face the toughest, most important job in their history. In addition, shortages and priorities in High Speed steel have made it necessary for every small tool user to exercise the strictest economy.

Real tool economy results when you choose taps and reamers bearing the Butterfield name. For you get both the precision demanded by defense production standards and the ruggedness necessary for economical long life. Choose Butterfields when you want precision — and the important extra dividend of economical long life.

BUTTERFIELD DIVISION

DERBY LINE, VERMONT

ROCK ISLAND, QUEBEC

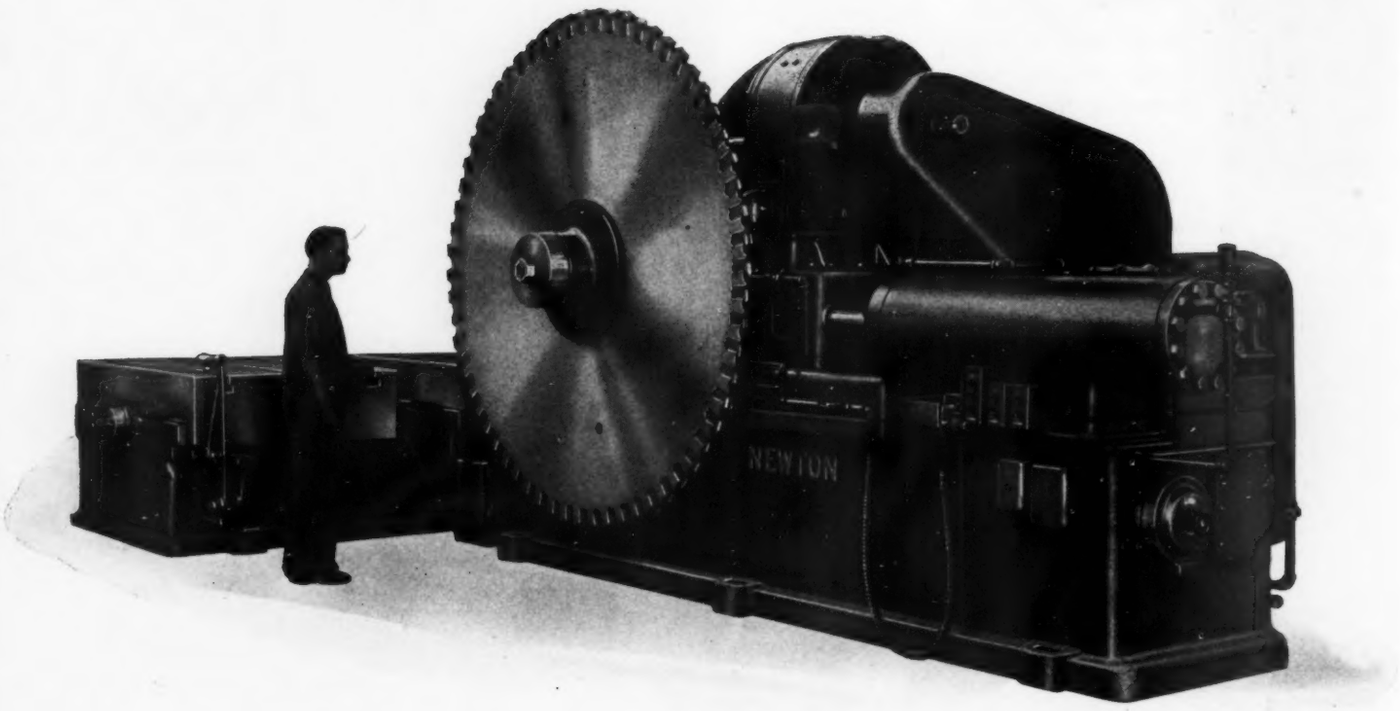
DIVISIONS of the UNION TWIST DRILL COMPANY

UNION

BUTTERFIELD

S. W. CARD

ANY FEED RATE — FROM A CREEP TO A RUN WITH NEWTON HYDRAULIC FEED COLD SAWS



This 90" Newton Hydraulic Feed Cold Saw, like all Newton Saws, gives you a choice of feed from lowest practical up to rapid traverse rate by a mere turn of the dial.

Besides providing extreme flexibility, it makes possible a very even drive and smooth cutting action.

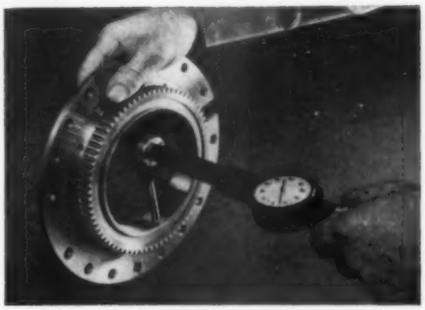
It is this hydraulic feed in connection with a new design wherein the blade cuts up instead of down, that permits you to use increased feeds with less frequent saw sharpening and with a marked reduction in saw tooth breakage.

Whatever you are cutting, ferrous or nonferrous metals, standard shop work or forgings, Newton Hydraulic Feed Cold Saws can improve your cutting off performance.

Send for Bulletin No. 536-A available upon request.

BETTS • BETTS-BRIDGEFORD • NEWTON • COLBURN • HILLES & JONES • MODERN

CONSOLIDATED
MACHINE TOOL CORPORATION
ROCHESTER, NEW YORK



ACCURACY AND SPEED are vital factors wherever our armed forces strike at the enemy.

ACCURACY AND SPEED in the production of war equipment to back them up is no longer a Preparedness Slogan.

ACCURACY AND SPEED in checking bores with close tolerances is now a reality.

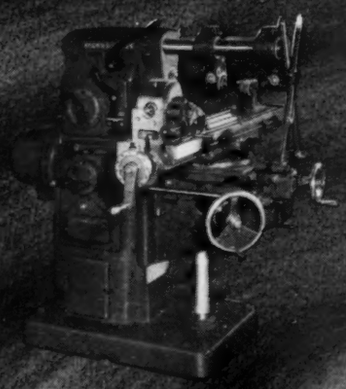
Standard Dial Bore Gages check bores to .0001" limits instantly with one simple operation.

Write for Complete Information.

STANDARD *Dial Bore Gages*

STANDARD GAGE CO., INC.
72 PARKER AVE. POUGHKEEPSIE, N. Y.

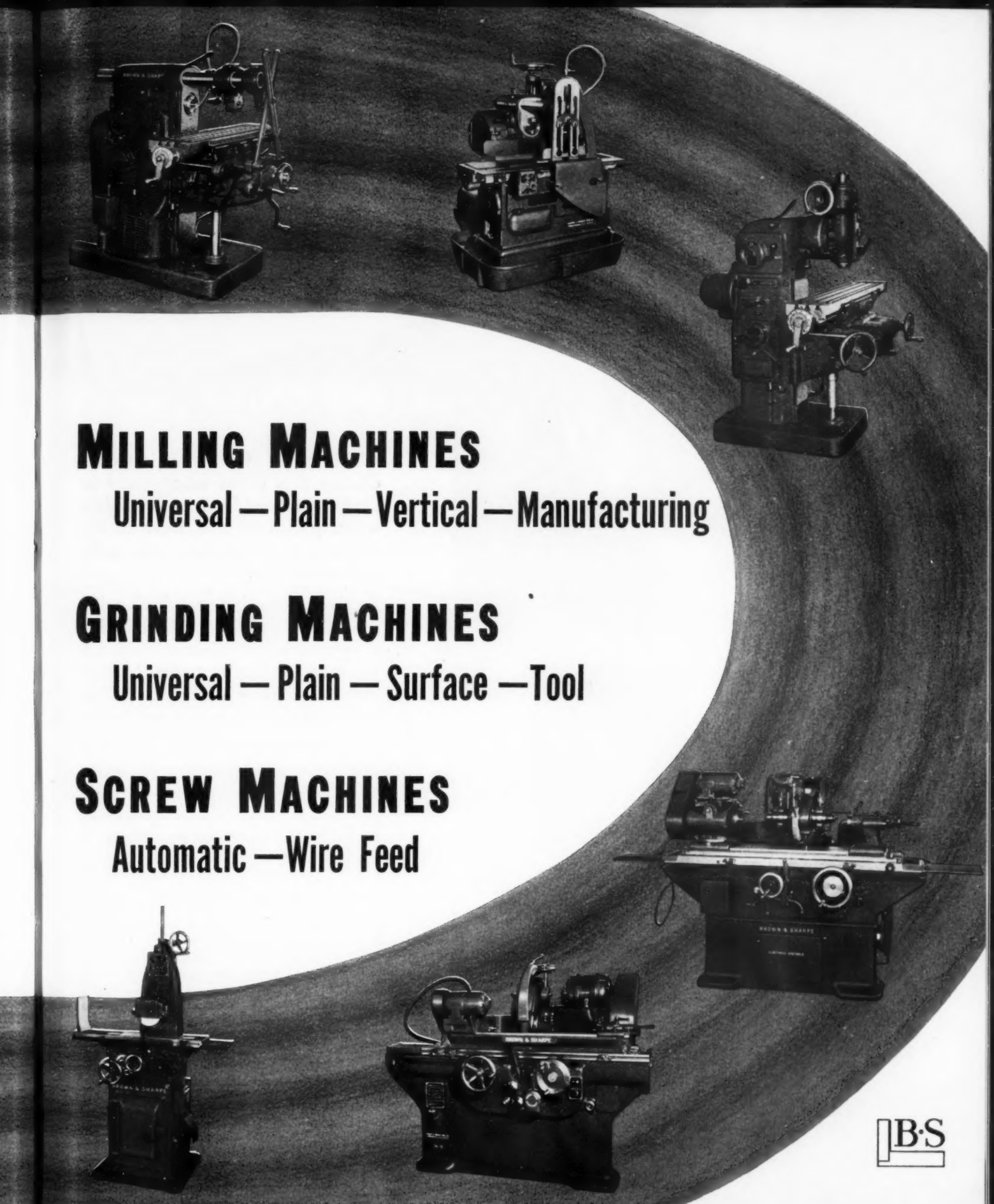
For Urgent National Defense Production . . . Today



. . with Accuracy and Dependability to serve Profitably on Future Needs in Manufacturing

Outstanding machines — notable for quiet and smooth operation • fast, safe control • and many other features giving high production and accuracy.
Brown & Sharpe Mfg. Co., Providence, R. I., U. S. A.

BROWN &



MILLING MACHINES

Universal — Plain — Vertical — Manufacturing

GRINDING MACHINES

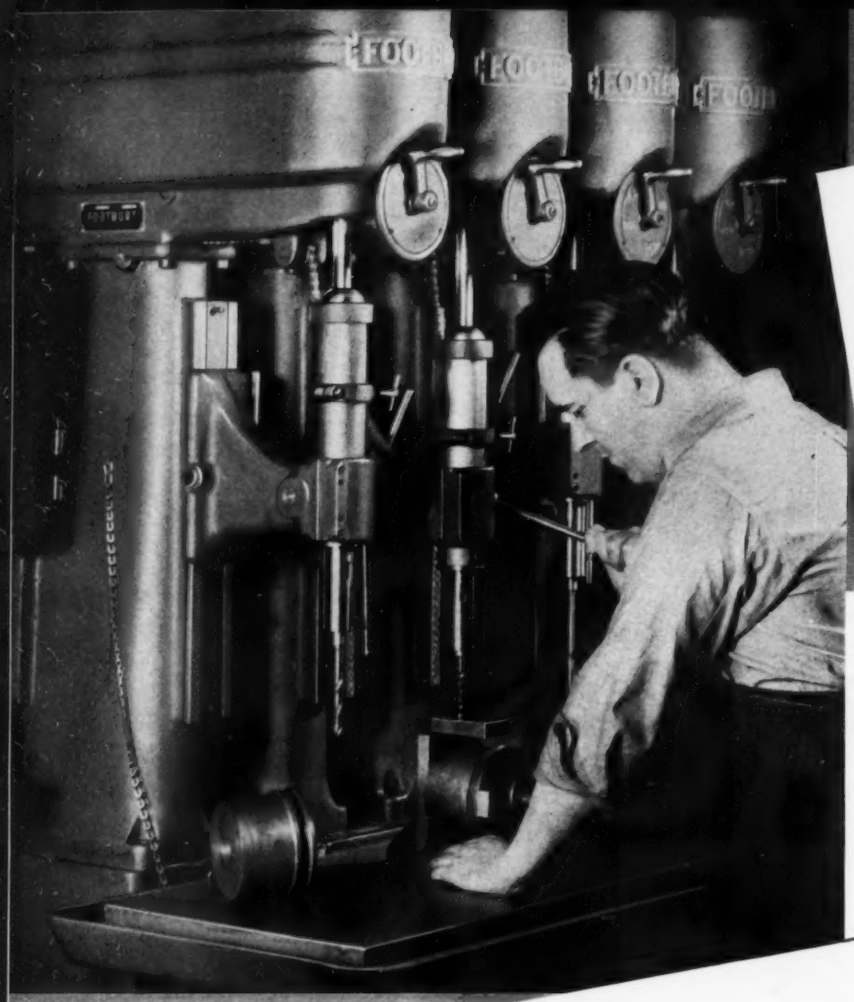
Universal — Plain — Surface — Tool

SCREW MACHINES

Automatic — Wire Feed

B·S

SHARPE



MACHINES FOR TOMORROW

● The choice of fine machine tools during this great emergency is an investment for future profits when products will have to be made with increased accuracy and efficiency.

Footburt sensitives are built with the wide range of speeds and with the power and sturdiness to handle work faster under present pressing times. They are built with the care and precision that will keep them accurate over a long period.

Footburt machines are tools for today—and tomorrow.

Standard Single Speed Motors on 10" Centers for all speeds

Back Gear Unit for slow speeds when drilling in tough steel

All moving parts enclosed

All Ball Bearing Spindle with 8" or 12" Overhang

No. 2 Machine with Back Gear
8" or 12" Overhang
5/8" Drilling Capacity in Steel
Optional Speed Ranges
185 to 2300 R.P.M. 280 to 3450 R.P.M.
Vertical Motor Drive with Standard Single Speed Motor
Power Feed Assembly
Tapping Attachment
Coolant Outfit

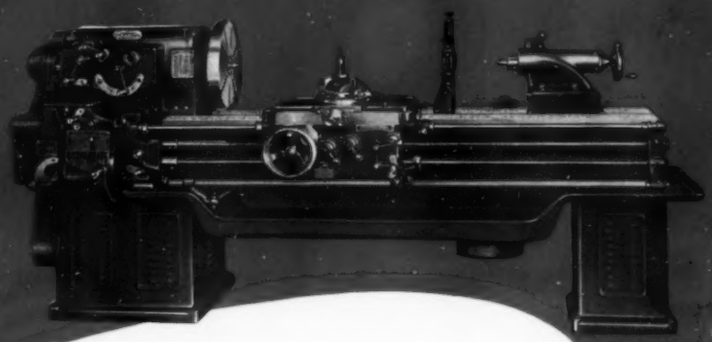
THE FOOTE-BURT COMPANY
CLEVELAND, OHIO
Detroit Office: 4-253 General Motors Building

FOOTBURT *Sensitive* DRILLING MACHINES

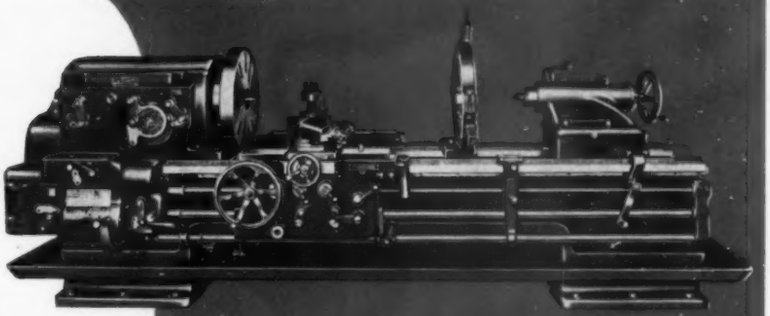
SIDNEY

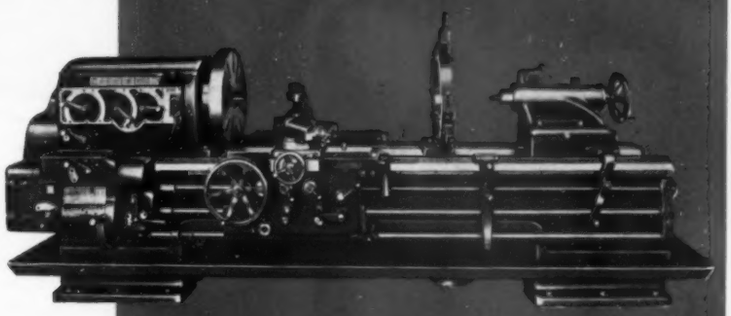
THE SIDNEY MACHINE TOOL CO., SIDNEY, OHIO, U.S.A.

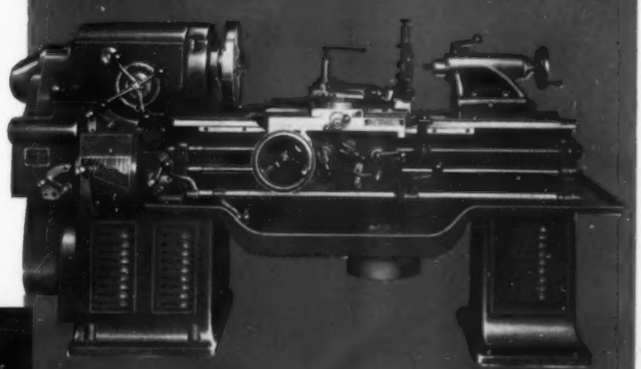
The mark of Lathe Performance and Economy



Lathes







● Continuous tooth herringbone gearing has long been recognized as a superior type of drive to attain greater strength, smoother more efficient power. This type of gearing is one of the outstanding features of Sidney Lathe for the past fifteen years.

●

TOOL ROOM LATHES. Sidney offers tool room lathes in four sizes ranging from 14" to 20" inclusive. 16 Speed herringbone gear headstock—48 feed changes from .0027 to .172"—48 thread changes from 1½ to 92—forced feed lubrication—anti-friction bearings throughout are a few of the points contributing to the wide range adaptability and long lived accuracy of Sidney Tool Room Lathe.

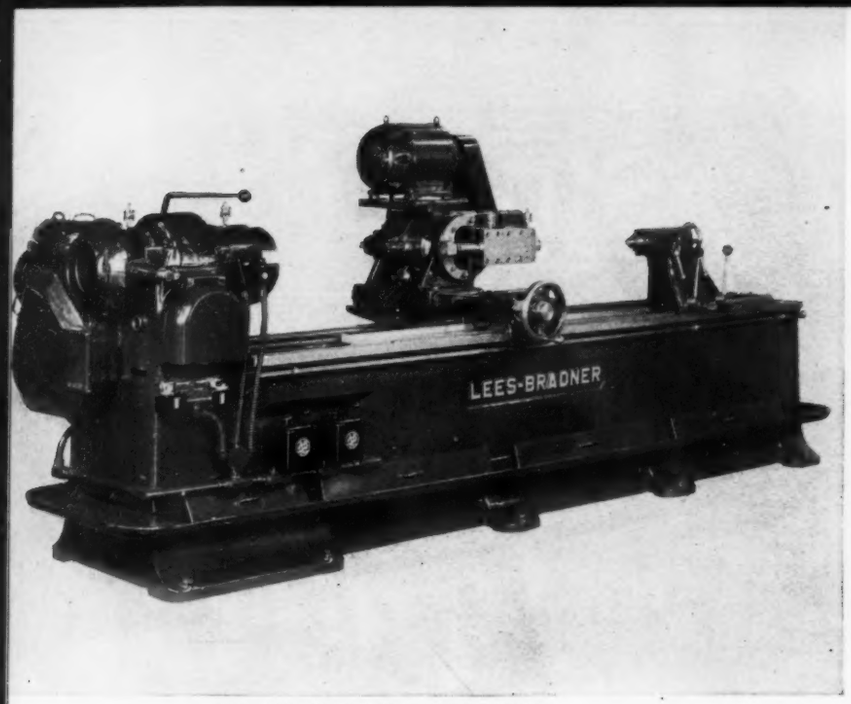
16 SPEED HERRINGBONE GEARED LATHE. Built in eight sizes from 14" to 36". This series of machines are husky and powerful to withstand heavy cuts yet extremely sensitive for thread chasing and finish turning. The Sidney Lathe Bed is exceptionally well braced to withstand heavy cuts—Double Wall Apron provides outer supports for all shafts in anti-friction bearings. The 14" and 16" machines provide spindle speeds from 14 to 562 RPM with higher optional speeds 25 to 1000 RPM and the 18"and 20" lathes have spindle speed range from 12 to 360 RPM or optional higher speed range 24 to 720 RPM. Here is range, speed and stamina combined in a well designed Lathe. The 24", 27", 30" and 36" sizes provides spindle speed range from 5 to 306 RPM and optional higher range 7 to 428 RPM. All speeds in geometrical progression.

12 SPEED SPUR GEARED HEAD LATHES. The Sidney 12 Speed Model offers a size range from 14" to and including the 36" size. This model provides spindle speed range from 14 to 534 RPM with optional range from 25 to 950 RPM in the 14" and 16" size; 12 to 365 RPM with optional range 24 to 730 RPM in the 18" and 20" size; 8 to 318 RPM or optional higher range 14 to 555 RPM in the 24", 30" and 36" sizes with selective threads and feeds as provided in the 16 Speed Models.

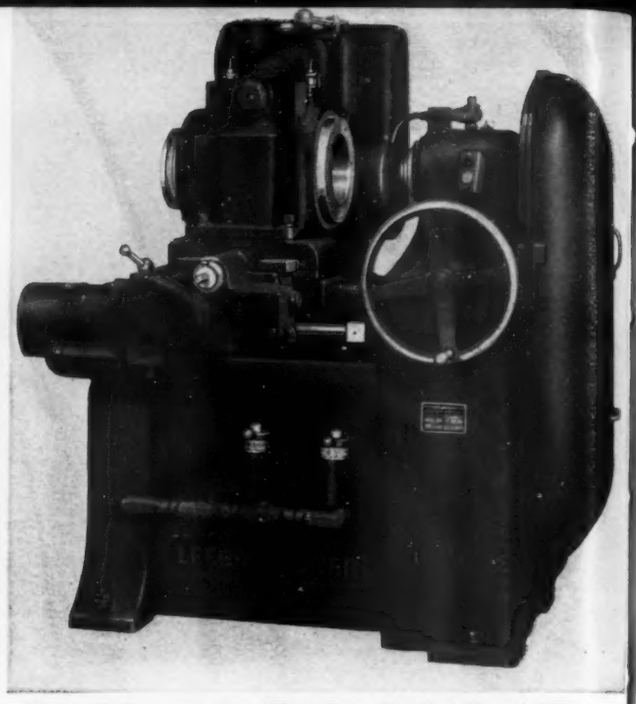
8 SPEED HERRINGBONE GEARED LATHE. Built with dial or three lever control in five capacities from 14" to 24". Eight spindle speeds are available through either handwheel or three lever control from 13 to 414 RPM in the 14" and 16"; 13 to 300 RPM on the 18 and 20" and 8 to 350 RPM on the 24" size. Simplicity and massiveness characterize design and assure both accuracy and close tolerance work.

Bulletins available for each model

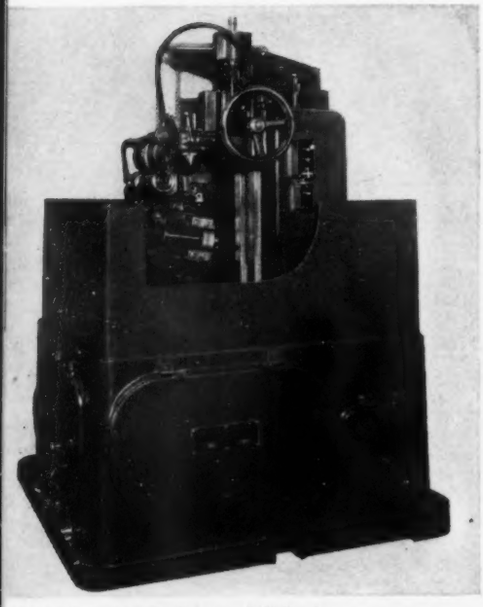
The SIDNEY MACHINE TOOL COMPANY Sidney, Ohio



Model HT 12x102" Heavy Thread Miller.
Also built in other length capacities.



Model 40 Automatic Ring (Hob) Type Chucking Thread Miller.

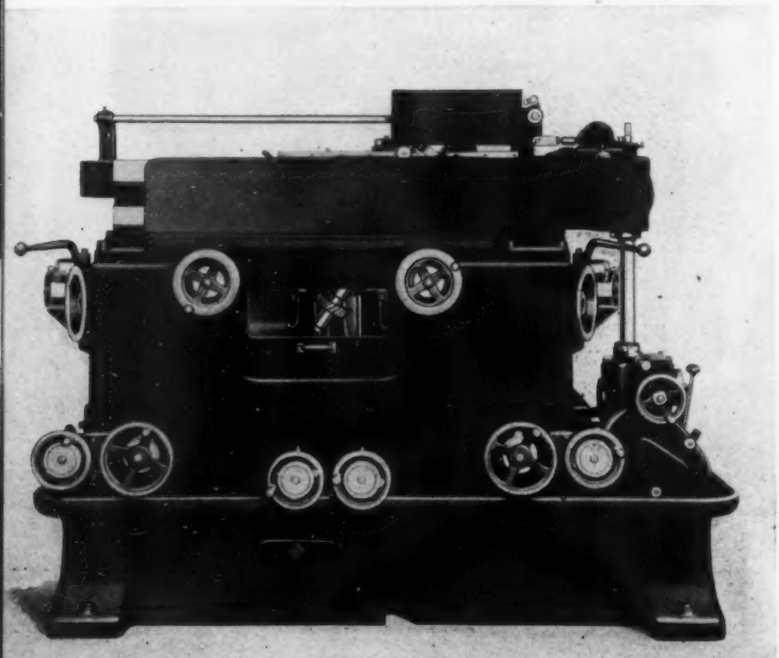


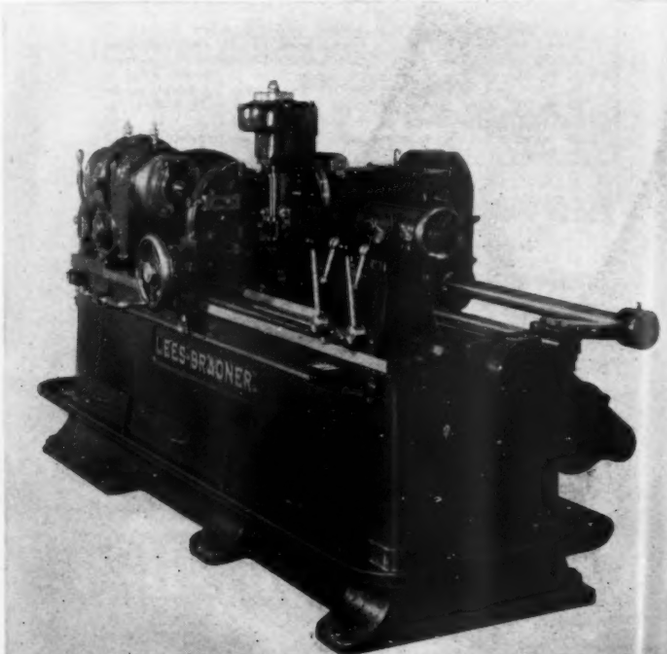
odel 12-S Automatic Spur and Helical Gear Hobber.

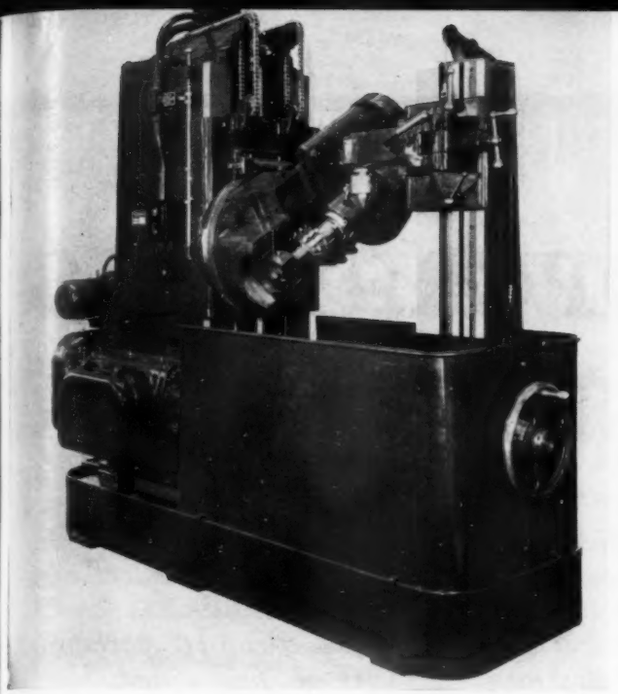
LEES-BRADNER
Contribute on

Model 2HS, 2-wheel Spur and Helical Gear Tooth Grinder.

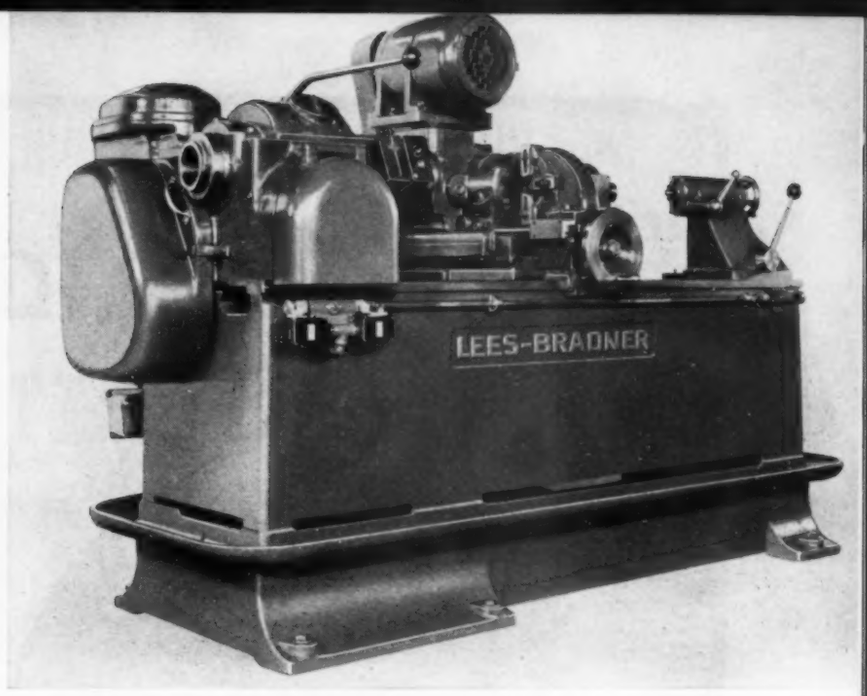
Model SH 6x54" Horizontal Gear and Spline Hobbing Machine. Also other bed length capacities.







Model R Extra Heavy Duty Spur and Helical Gear Hobbing Machine (Rating) 1-1/7 D.P.)



Model LT 6x36" Light Thread Milling Machine. Also built in other bed length capacities.

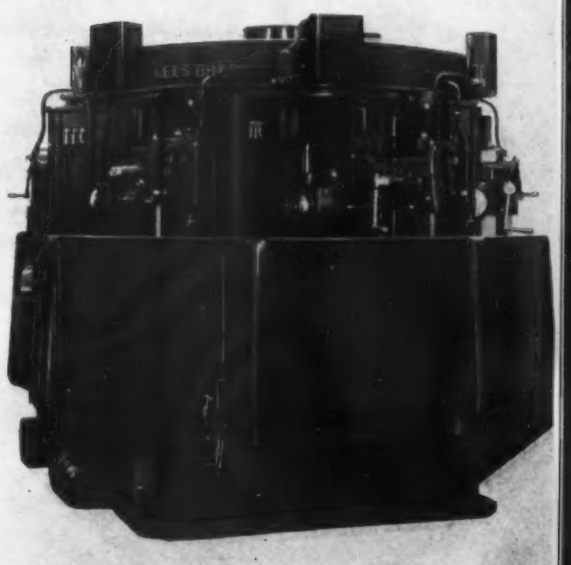
Model CT 54 Heavy Duty Chucking Thread Miller. Also built in other bed length capacities.

R MACHINES
n Many Fronts

Model 7-AC. 6-spindle Rotary Gear Hobber. (Also built in 4 and 8 spindle units.)

• Lees-Bradner machines are speeding vital equipment and material to the Army—the Navy—the Air and the Allied Forces.

Lees-Bradner pioneering and experience in the building of gear hobbing—spline hobbing — gear grinding and thread milling equipment assures the utmost in efficient production at the high speed today's requirements demand.



LEES-BRADNER CO.

CLEVELAND, OHIO

OPERATIONS

Many indeed are the grinding operations which have to be performed on an in-line airplane engine crankshaft.

Indicative of one manufacturer's high regard for Landis grinding equipment is the fact that he is using Landis Grinders for 15 different operations. The group of machines includes numerous sizes of Type C and Type D Plain Hydraulics, Type D Hydraulic Crank Pin Grinders and Web Contour Grinders.

The latter type of machine is the one illustrated. No better example could be shown to indicate how Landis has adapted its years of experience to the pressing needs of today's defense industries.

Primarily the web contour operation is necessitated by the fine balance which must be imparted to all in-line airplane cranks. At the same time a scratch-free surface is imparted rapidly to the irregularly shaped portions of the shaft.

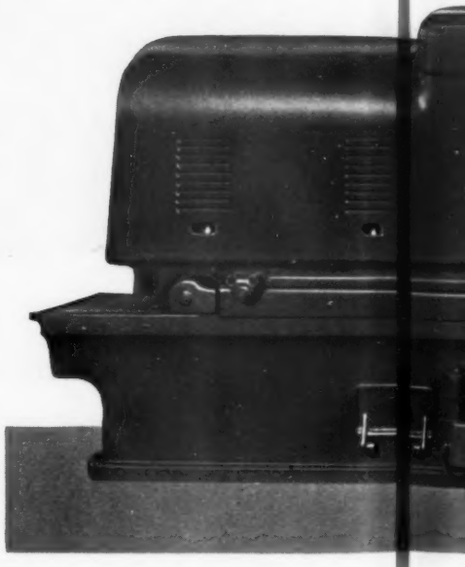
The 21" x 72" Type D Web Contour Grinder shown to the right is a unique machine.

It is, in many respects, a Cam Contour Grinder having more than usual swing. Operation is simplified to a great degree. Traverse of the cam roller takes place automatically as the work table traverses. Most of the machine movements are controlled by the shifting of one large conveniently located main control lever.

All in all, it is a massive machine which is performing a difficult task well.

Unusual Performance As Usual

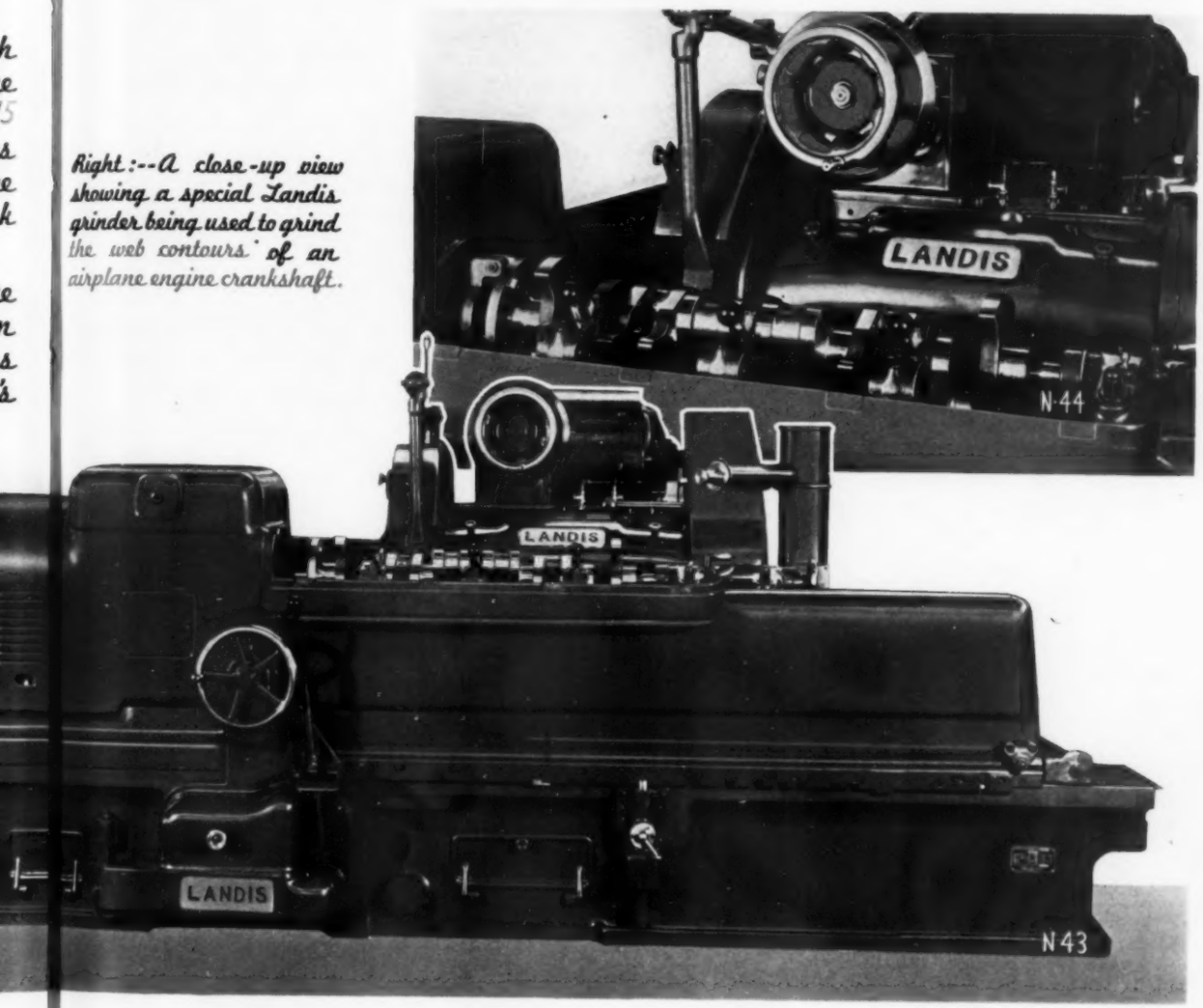
PRECISION LANDIS GRINDERS



Above:--The efficient looking Landis crankshaft web contour grinder shown above was recently installed in the newly finished plant of a well-known manufacturer. There it is being used for a difficult grinding operation on the web contours of the crankshaft used in a famous airplane engine.

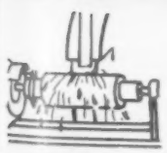
ARE PERFORMED BY LANDIS GRINDERS

Right:--A close-up view showing a special Landis grinder being used to grind the web contours of an airplane engine crankshaft.



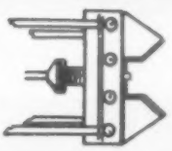
LANDIS TOOL COMPANY

WAYNESBORO
PENNSYLVANIA



FIRST TO USE A COOLANT SYSTEM AS INTEGRAL PART OF GRINDING MACHINE.

FIRST TO SUCCESSFULLY APPLY HYDRAULICS TO GRINDING MACHINES GENERALLY.



FIRST TO DEVELOP MANY NEW FEATURES SUCH AS LANDIS-SOLEX SIZING.

386

Micromatic Anticipates Future

1. Micromatic work holding fixtures assure MAXIMUM EFFICIENCY in GENERATING FINAL SIZE, GEOMETRIC ACCURACY, SURFACE QUALITY and SURFACE FINISH.

2. Micromatic Manually Controlled Huttohones fulfill lower production needs with minimized equipment for any amount of stock removal desired.

3. Micromatic Automatically Controlled Microhones are specific purpose tools, for stock removal usually not exceeding .003" to .004" at rate of .001" per minute.

4. Micromatic Hydraulically Controlled Hydrohones and Drawfinishing Tools are specific purpose tools, for rapid stock removal up to .025" to .030" at rate of .010" to .012" per minute.

5. Micromatic Hydraulically Controlled Tubing Hones remove from .001" to .075" stock in bores up to 30" diameter x 75 feet long—at rates up to .012" per hour—generate accuracy within .0005" to .001".

6. Micromatic Hydraulically Controlled Hydrohones (with or without remote control) remove from .001" stock upwards in tubing and large diesel liners—at rates up to .012" per hour—generate accuracy within .001".

7. Micromatic Model 100 Hydrohoner with Automatic Microsize Control and Loading removes up to .002" or .003" stock in bores from ¼" to 1" diameter x 6" long—generates accuracy within .0001" to .0002" and size within .0005"—at rates up to 200-240 pieces per hour.

8. Micromatic Model 200 Hydrohoner removes up to .003" or .005" stock in bores from 1" to 2" diameter x 6" long—generates accuracy within .0001" to .0003"—at rates up to 120-140 pieces per hour.

9. Write for Bulletin AR-57: "Microfinish" and Bulletin AR-60: "The Micromatic Hydrohoner".

MICROMATIC HONE CORPORATION

Production Honing Needs

1345 E. Milwaukee Ave., Detroit, Mich., U. S. A.

BEST ANSWER

TO MOTOR BEARING PROBLEMS

IN 1930

AND TODAY

Westinghouse Sealed-Sleeve Bearings keep oil IN . . . keep dirt OUT

Motor users need two kinds of bearing protection to avoid costly delays in today's tight production schedules: (1) Against oil leakage that leads to dry bearings and burnouts; (2) Against infiltration of dust and dirt which causes scoring and excessive wear. Westinghouse Sealed-Sleeve Bearings protect you both ways.

"Oil sealed in—dirt sealed out" rang the bell with motor buyers before 1925. They tried the motor. They found it lived up to its reputation. Judging by the number of industrial buyers now ordering CS Motors for the exacting grind of emergency production they like the idea better than ever today.

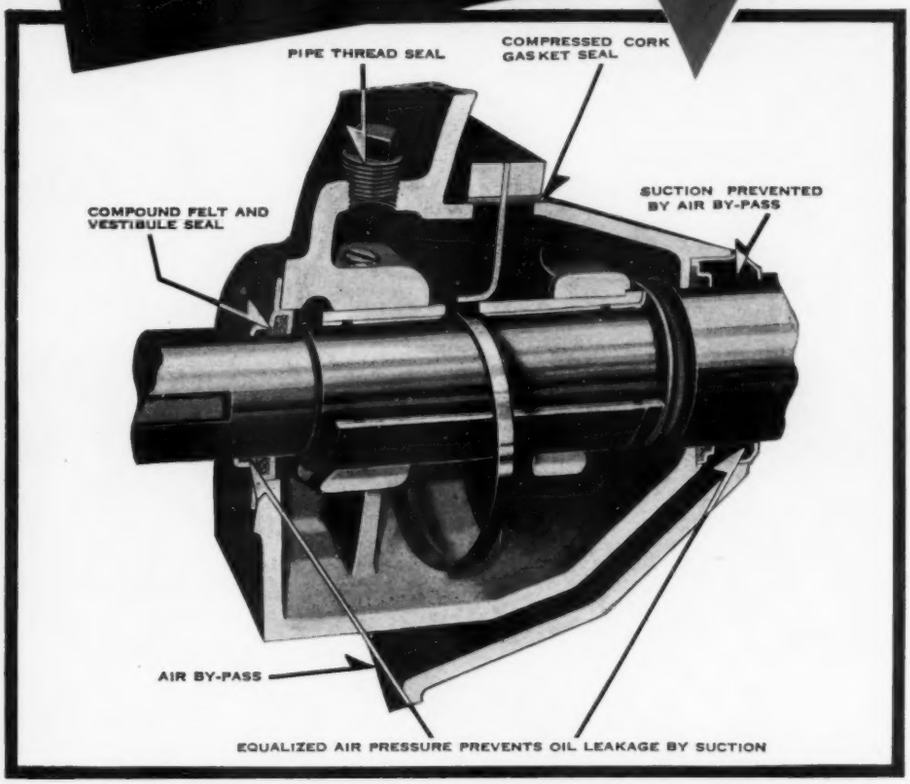
Along with the cast frame and Tuffernell insulation, sealed-sleeve bearings are a special feature of CS Motors, largely responsible for their present wide acceptance.

Many of the earliest motors equipped with sealed-sleeve bearings, are still in service today with the original bearings. The advantages of this basic design are now augmented by improvements based on more than ten years of operating experience.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO., EAST PITTSBURGH, PA.

Westinghouse

SEALED SLEEVE BEARINGS


PIPE THREAD SEAL
COMPRESSED CORK GASKET SEAL
COMPOUND FELT AND VESTIBULE SEAL
SUCTION PREVENTED BY AIR BY-PASS
AIR BY-PASS
EQUALIZED AIR PRESSURE PREVENTS OIL LEAKAGE BY SUCTION

Only in Westinghouse CS Motors do you find the complete protection against dirt and dust of the dual felt gasket and vestibule seal along with the Westinghouse air by-pass which equalizes air pressure inside and outside so that oil leakage due to suction is positively prevented.

RENEWAL PARTS AND SERVICE

Not only for current models, but for any Westinghouse Motor or control device ever built. Westinghouse assumes the responsibility of providing renewal parts. They are made to the same rigid standards as the original equipment. Parts are therefore interchangeable and maintain the original performance.

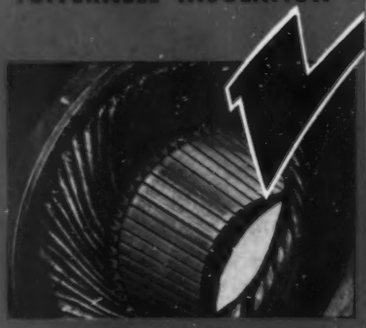
The 34 district manufacturing and repair plants are so located throughout the United States that parts or service are available overnight wherever your plant may be.

J-21177

ONE-PIECE FRAME

The integrally cast frame of the Westinghouse CS Motor, developed and introduced by Westinghouse, protects the electrical elements fully against twisting strain and vibration.

TUFFERNELL INSULATION



Includes the Westinghouse insulating slot cell, plus taped end turns giving extra strength at the most vulnerable spots. The final dipping and baking completes the protection which resists abrasive wear due to dust, dirt, and grit. In addition to the standard A.I.E. tests each Westinghouse CS Motor must also pass the Westinghouse Radio Frequency test—the only test which detects flaws and weak spots in insulation between each individual turn of the windings.

Type CS Motor with sealed-sleeve bearings, one-piece frame, and Tuffernell insulation.

Type CS Motors

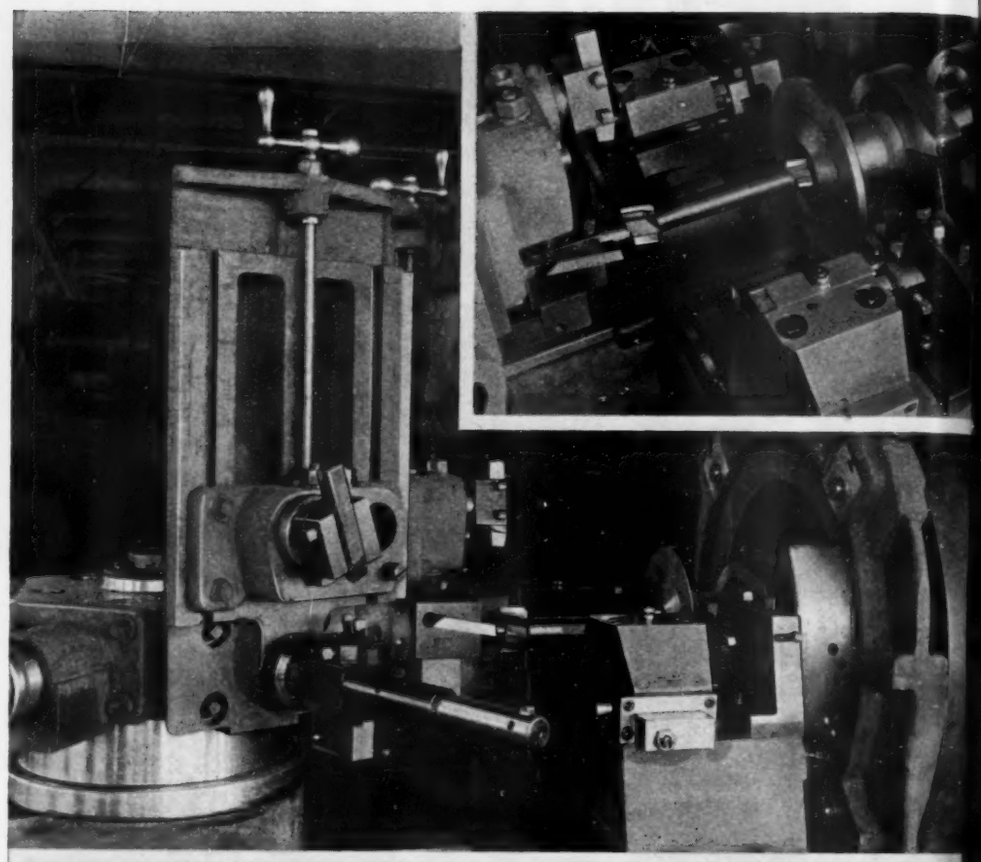
BLUEPRINTS

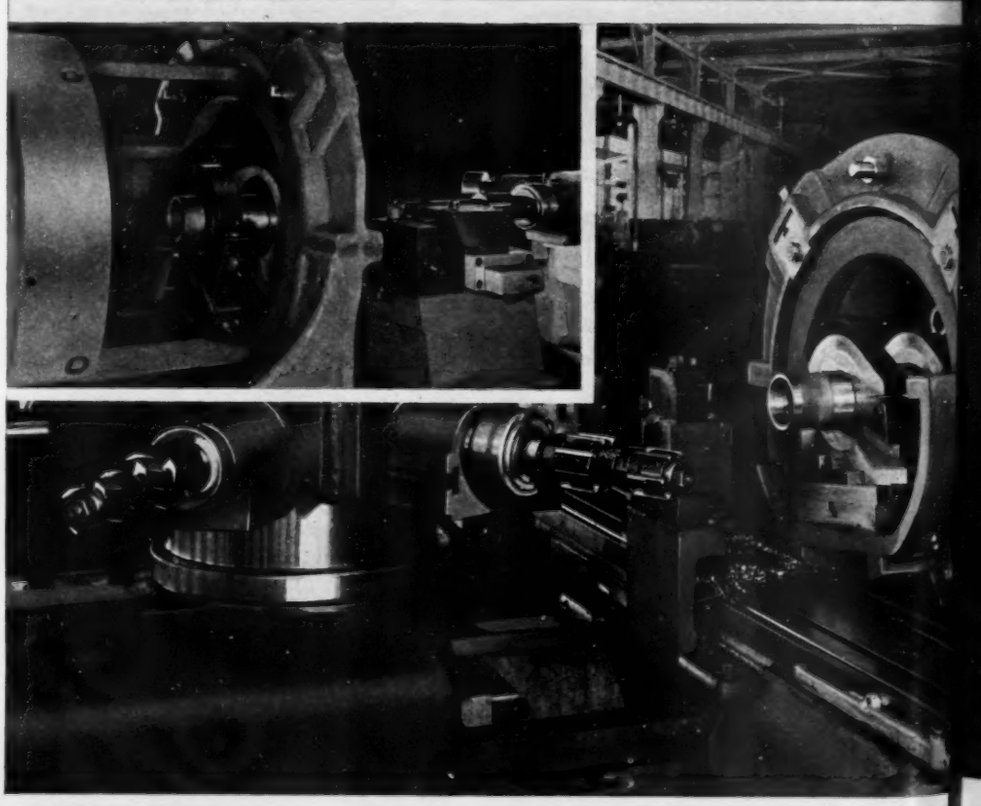
Record Economy in Aircraft Production with No. 6-DREL AUTOMATICS

Two timely subjects—that of finishing alloy steel Wright Aircraft Engine propeller shaft forgings, 321 Brinell, in record time on P&J AUTOMATICS, Model 6-DREL. These P&J Machines finish the flanges and the stepped bores on each of these jobs, utilizing the five turret-face toolings,

In the Floor-to-floor Time of 41 Minutes: 1.25 Pieces per Hour per Machine.

The amount of stock removed—the cutting qualities of the steel—and the specified fine finish are factors which emphasize the ingenuity of the toolings and the power and rigidity of the machines. Note that P&J method of holding the work, particularly apparent in the insert to the lower photograph. Similar efficiencies can be planned and executed for your work—simply apply to P&J for recommendations. There is no obligation for this service.



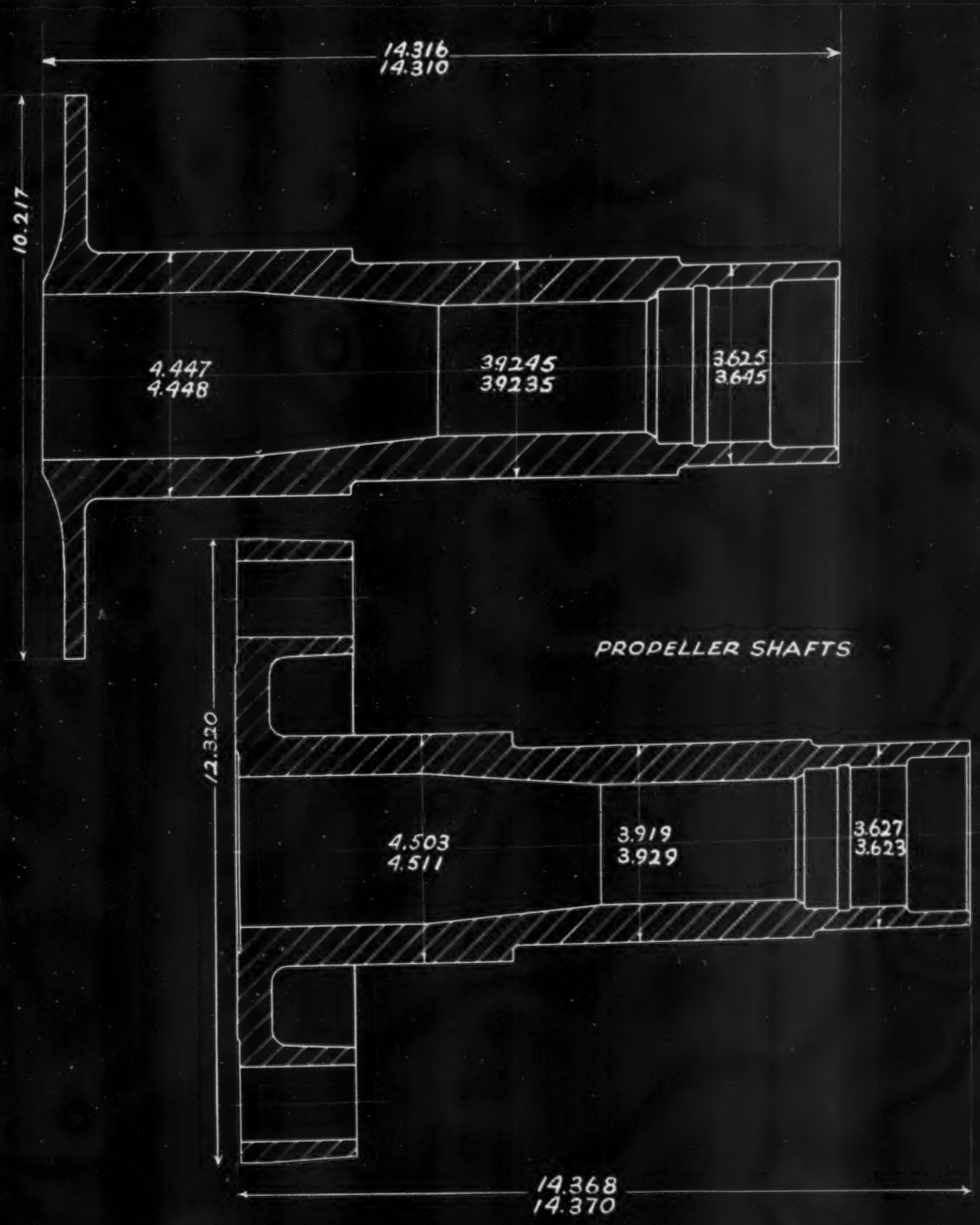


POTTER & JOHNSTON MACHINE COMPANY

PAWTUCKET, RHODE ISLAND

POTTER & JOHNSTON

S OF PRODUCTION



N AUTOMATICS

GREATER OUTPUT...

BECAUSE YOU CAN SEE

TEXACO TRANSULTEX in use by Lufkin Foundry & Machine Company, Lufkin, Texas, on herringbone pinion job. Big success here for past 3 years.

MORE PIECES per hour can be made, when you use a cutting oil that lets you *see* to adjust cutter and work *without stopping the machine.* Such an oil is *Texaco Transultex Cutting Oil.*

On tough jobs, high carbon, nickel, chromium and stainless steels, cutters stand up longer, finish is smoother, output is up. *Texaco Transultex* is so transparent that you can read newsprint through an inch of it.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred also in the metal cutting field.

These Texaco users enjoy many benefits that can also be yours. A Texaco Engineer specializing in cutting coolants will gladly cooperate . . . just phone the nearest of more than 2300 Texaco distribution points in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.

THEY PREFER TEXACO

★ More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

FOR YOUR ENJOYMENT—TWO GREAT RADIO PROGRAMS

FRED ALLEN every Wednesday night. See your local newspaper for time and station.

METROPOLITAN OPERA. Complete broadcasts of great operas every Saturday. See your local newspaper for time and station.

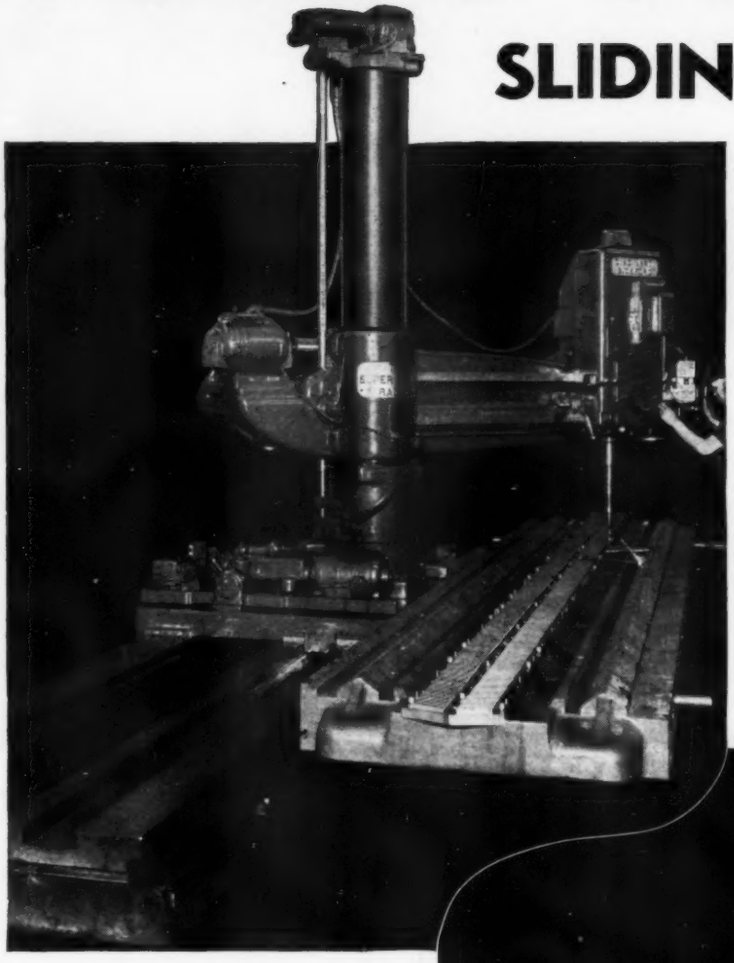
TEXACO

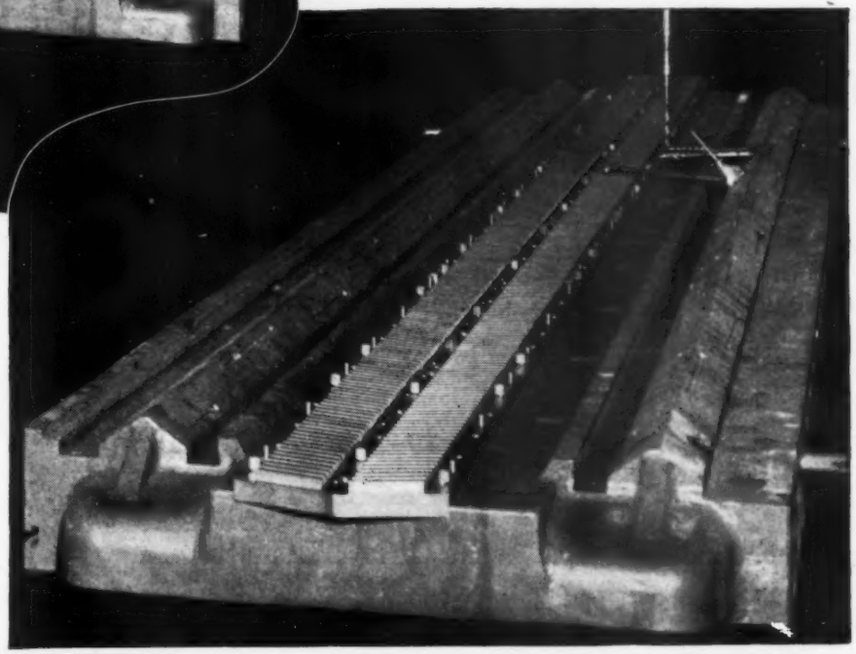
REG. T. M.

TEXACO Cutting and Soluble Oils
FOR THE METAL-WORKING INDUSTRY

RETURN METAL DRUMS PROMPTLY . . . thus helping to make present supply meet industry's needs and releasing metal for National Defense.

The Cincinnati Bickford
SUPER SERVICE
SLIDING BED
Radial
DRILL
SPEEDS UP
HANDLING TIME





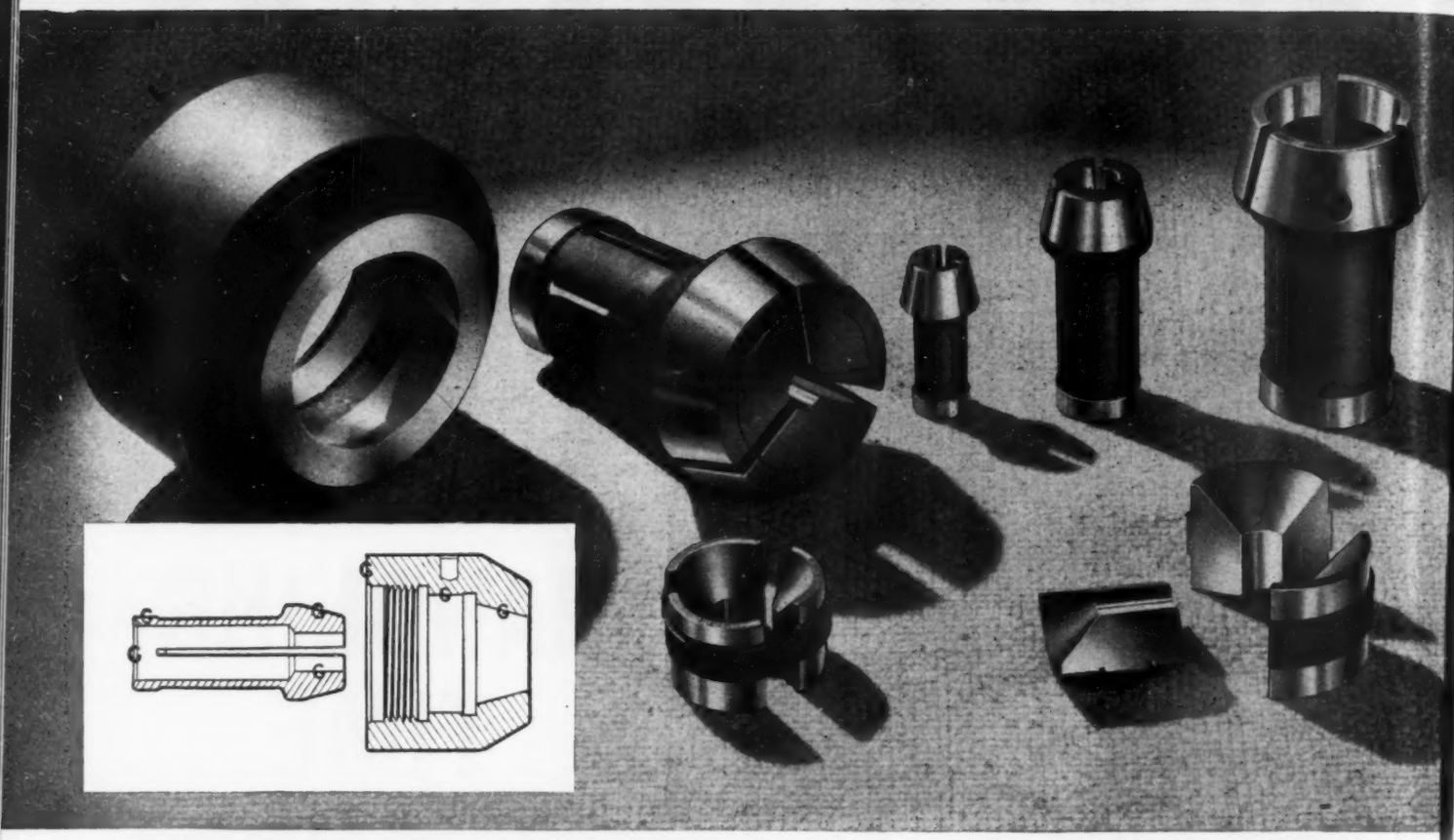
At the Cincinnati Planer Co. this planer table (62"x22') is being drilled and tapped, also drilled and reamed for taper pins that hold rack in place.

The Super Service "Sliding Bed" Radial Drill has facilitated a 20% cost saving by not constantly necessitating the use of the crane to reset the work. Now large work is set once or twice by the crane operator and the Super Service Radial Drill and the Drill Hand does the rest, thus greatly speeding up all-around production.

Send for further information about any Cincinnati Bickford Super Service metal drilling machines.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY · CINCINNATI · OHIO · U. S. A.

Get MORE PRODUCTION *from* OLD *and* NEW TURRET LATHES



One Simple Way is: MAINTAIN COLLET ACCURACY

• Nothing slows production and increases scrap loss more than inaccurate holding of work, bars, small castings and forgings . . . yet insuring collet accuracy is not difficult.

On *old* Warner & Swaseys we can furnish collet assemblies with instructions that tell how to get *new* machine accuracy regardless of age of your Warner & Swasey Turret Lathe.

Warner & Swasey Collets and Hoods are ground *after hardening,* to eliminate all hardening distortions. (See G in diagram above.) Taper and bore of round collets are ground *at the same setting*—a patented process.

New Warner & Swasey Collets may be a quick, inexpensive way to step up *your* production. Why not find out? Write

Full descriptions of our Collets, Hoods, Bushings, etc., are found on pages 134, 135 and 136 of Warner & Swasey Tool Catalog. Do you have your copy?

WARNER & SWASEY
Turret Lathes
Cleveland

YOU CAN TURN IT BETTER FASTER FOR LESS . . . WITH WARNER & SWASEY TOOLS

WHAT'S IN THIS ISSUE

TWELVE MONTHS' PROGRESS

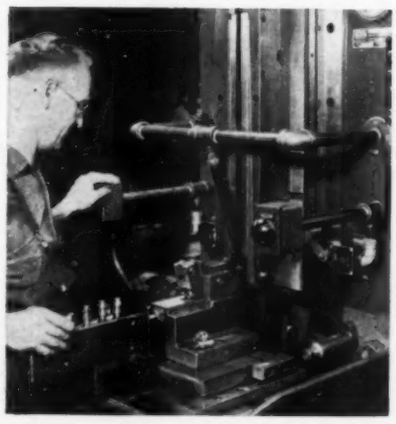
Once a year AMERICAN MACHINIST reviews the new equipment, accessories, parts and materials that have been introduced to the metal-working industry during the previous twelve months. The following pages contain this annual review. All the announcements made in our Shop Equipment News section during 1941 are summarized by word and picture. They serve as a ready means of reference for the selection of shop equipment and supplies. Together with previously published reviews they form an encyclopedia of progress in the metal-working field.

HOW TO USE IT

Nearly 1,000 separate items are listed on these pages. For the reader's convenience, they are classified under six main headings and 60 sub-headings. These headings are indexed on page 79. As a further convenience in locating individual items in this review, each of the six main divisions is headed by a heavy separator page which again lists the sub-divisions in that particular group.

WHERE TO FIND IT

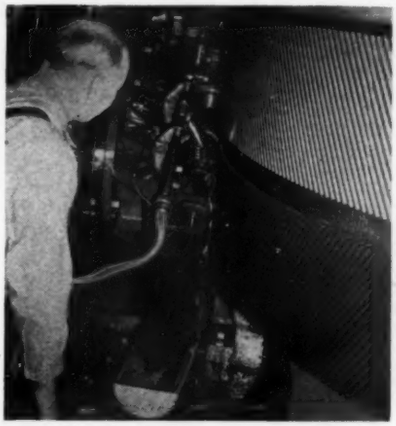
To make this issue doubly valuable, a complete Where-to-Buy Directory has been included beginning page 429. In it all kinds of shop equipment and supplies are classified under more than 550 headings. Many companies that have not announced new products during the past year are listed in this section under appropriate classifications. The quick reference which this directory gives to sources of supply will save valuable time in placing orders or securing quotations.



Surface broaching has been applied to a large number of small parts, particularly rifle and machine-gun components

METAL-WORKING TRENDS

The metal-working industry today is devoting by far the greater portion of its energies toward winning the war. How this was done during the past year in terms of industrial plant developments has a number of dramatic highlights. These are outlined in an article "Mars Rules Metal-Working Trends" to be found on page 77.



The need for large gears used in ship propulsion has created a demand for large sized gear-cutting machines

COMING

For months the editors of AMERICAN MACHINIST have been planning for 1942. Naturally the first thought has been to contribute to the job of winning the war. The aim has been to furnish information to the men behind the lines, the men in the shop and those directing production, so that they can acquaint themselves with the new problems raised by armament manufacture.

It is proposed now to continue this program on an enlarged and intensified scale. During 1941 AMERICAN MACHINIST won the first award offered by *Industrial Marketing* for the best series of articles published by a business paper; this award was made in recognition of the Armament Section which has been published continuously in these pages since September, 1940. Through the cooperation of the War and Navy Departments, the armament section will be continued. Its objective has not been to give picture stories of industrial plants, such as may be found in popular magazines, but to tell in detail of the tools and jigs that must be used for turning out the war products in quantity. Certain subjects are obviously taboo. But where secrecy is not imposed because of military reasons, articles in AMERICAN MACHINIST will emphasize practical working data on these products.

Special machines mark the aircrafts industry's transformation from a job-shop to a quantity-production basis

An early number will contain a comprehensive article on the manufacture of the Oerlikon anti-aircraft gun as carried out by the Pontiac Motor Company. Other articles during the year will describe a wide variety of operations on aircraft, tanks, guns and the many other things that are needed for ultimate victory.

How can American industry make best use of its industrial plant capacity? One way is by the extension of subcontracting. Much has been done in this direction, but not enough. The cooperative plan now in use in San Jose, Calif., has proved so successful that other communities may profit by its example. It will be described in an article that will appear in the near future.

It is hard to see why a change in the standard machine tool paint color will speed production, but that's just what it does. Wendell E. Whipp, president, Monarch Machine Tool Company, and chairman, Color Standards Committee, National Machine Tool Builders Association, will tell all about it in our next issue.

ARMOR PLATE

. . . is being straightened on this husky Cincinnati Press Brake. Tank armor plate is warped by heat treatment and must be straightened. The efficient and accepted method is to strike these tough steel slabs repeatedly between dies mounted in a large press brake.

Write for Complete Recommendations

Pioneers of the Steel Press Brake

THE CINCINNATI SHAPER CO.

SHAPERS · SHEARS · BRAKES

CINCINNATI, OHIO.

Mars Rules Metal-Working Trends

DURING THE PAST YEAR, efforts to win the battle of production overshadowed every other influence in the metal-working field. The year witnessed the creation of a munitions industry in the United States where previously none had existed worthy of the job to be done.

Initial attempts to fill the breach with equipment on hand were augmented by real production lines on aircraft, shell, tanks and the hundreds of other products which a mechanized army must have. Wherever possible, standard machine tools have been employed; suitable tooling has been provided to make these machines effective on the production of munitions in quantity. In other cases the design and construction of special machines has been justified. Many of these special machines have already been completed and are now engaged in the task of winning the war.

Guns and warfare are almost synonymous. It is natural, therefore, that gun manufacture should receive a great deal of technical attention during times like these. New machines have been designed for drilling, boring and reaming guns of nearly all sizes. For instance on rifle and machine gun barrels the familiar horizontal machines have been supplemented with vertical multi-spindle machines that have given marked economy in floor area.

In machining the Browning machine-gun barrel, for instance, a six-spindle vertical drilling machine now feeds the work downwards over stationary drills. Each spindle is independently controlled and operates on an automatic cycle. It is only necessary for the operator to chuck the barrel and then press a pushbutton to set that particular spindle in motion.

Similarly, a 12-spindle vertical machine is now used for reaming this barrel. In this case, the barrel is pulled upward over the revolving reamer. At the top of the stroke, the reamer is stopped automatically, and the barrel drops down over the tool to the loading position.

Still another vertical machine is employed for the chambering operations which finish the bullet seat. This machine has ten stations and employs nine separate reamers in the working positions. The barrels are indexed automatically from station to station.

One of the time-consuming operations in gun production has been the cutting of rifling grooves. Machine tool designers have given considerable attention to the task of shortening this step and have achieved

notable success. It was found that the old single-tool method could be replaced by broaching on many sizes of guns. For the smaller calibers, which include the cal. 0.30 rifle and machine gun, the cal. 0.50 machine gun and the 20-mm. anti-aircraft gun, pull broaches are now used successfully.

The process is the same in principle as that used for cutting internal splines. The broaching tools take a shaving cut off the bore itself in addition to cutting all the grooves simultaneously. On the cal. 0.50 machine gun, an automatic multi-station machine, designed especially for this work, uses a set of five broaches. The barrel is chucked on a horizontal drum and is indexed from one tool position to the next.

Push Broaching Speeds Rifling

Guns of larger caliber, ranging from 37 mm. to 6 in., are rifled by means of push broaching. The tools consist of flat disks which are pushed through the gun bore successively on horizontal machines, either hydraulically or mechanically driven. Thirty or more such broaching tools may be used to complete the grooves in the bore of a single gun. However, since all grooves are cut simultaneously, the saving in time is appreciable. Older methods frequently employ several hundred indexings before the proper depth in each groove is reached. These rifling operations depend on provision for a generous supply of cutting oil which flushes away chips that would otherwise mar the surface.

Broaching has found further application on the surfaces of small rifle and machine-gun parts. Components such as triggers and sights use broaching set-ups to machine irregular contours. Formerly these parts required a large number of set-ups on milling and profiling machines to complete the same work.

Shell turning has been carried out both on conventional lathes and machines of special design. Automatic multiple-tool lathes have proved a satisfactory solution for the quantity production of shell. Cemented carbide tools have found wide application.

Another solution is the use of a newly developed vertical turning machine which is made in both single and multiple-spindle designs. Such machines use a disk-type form cutter while the work is rotated and fed vertically past the tool. Special shell turning machines are frequently designed with an eye to simplification; the number of feed and speed variations is reduced to a minimum as is possible when large quantities of a uniform product are machined.

The demand for turbine reduction gears, needed for naval vessels, has led to building a number of large precision gear-cutting machines. One such machine will cut gears of 120 in. in diameter with a 48-in. face, and a 45-deg. helix angle. Two opposite cutter heads permit operation on both faces of a herring bone gear at one time.

Perhaps the high point in special machines for war production is the installation of a two-section automatic transfer machine for drilling, countersinking, reaming and tapping aluminum cylinder heads for aircraft engines. This machine replaces 40 ordinary machine tools. The first unit has 16 stations and performs 25 separate machining operations with 64 tools; the second unit has 53 stations and performs 46 operations with 70 tools. A complete cylinder head is turned out every two minutes.

Because of the step-up in production, gaging and inspection devices have been improved to keep pace with the machining operations. Electrical gages have consequently been used to a far wider extent than heretofore. Another gaging method uses an air gap controlled by the size of the part being gaged; calibration on a pressure-reading device is used to indicate the size within close limits.

Nearly all instruments of modern warfare must be transported over great distances in a minimum of time. Therefore, many of their parts are heat-treated to give a combination of lightness and great strength. The result has been a strong impetus to the development of heat-treating processes and equipment. Automatic furnace handling is particularly desirable where large quantities have to be processed. Oven furnaces, bath furnaces, induction heating and flame hardening have all been subject to new development.

Forging methods have also been improved. Because of the large quantities involved, shell forging has been given particular attention. Many such forgings are made by upsetting in multiple dies, but other methods have come into use which employ combinations of piercing and drawing. One of the new processes uses a square billet and employs roller type dies for forming the shell.

Welding Widely Adopted

Welding as a method of machine fabrication made rapid strides during 1941. For instance, gun mounts are now widely fabricated by welding together alloy steel sections to combine strength with mobility. Arc welding is applied to armor plate fabrication with great savings in time over other methods. Aircraft manufacture has profited by the adoption of both arc welding and spot welding in many applications.

Many plants have found it advisable to install down draft exhaust systems for cleaning and finishing metal parts. These systems use gratings on the floor or on tables of convenient height. When castings are placed on these gratings they may be cleaned with power-driven wire brushes or snagging wheels while the dust and grit is carried downward to preserve the operator's health and the cleanliness of the plant. The same system is used with spray painting. Here the fumes and paint particles are carried away, making it possible to carry on this operation without the use of inclosed booths. Whether the downdraft installation is used for cleaning or painting, the exhaust air is carried over a water tank which catches the particles.

While emphasis in the metal-working industry is necessarily on immediate large scale production, development of improved methods still continues. Where a machine or process can show notable savings in time and man-power, it is being adopted as rapidly as possible. Since the emphasis has changed from defense production to war production, no effort is being spared in manufacturing those products that will lead to an ultimate victory.

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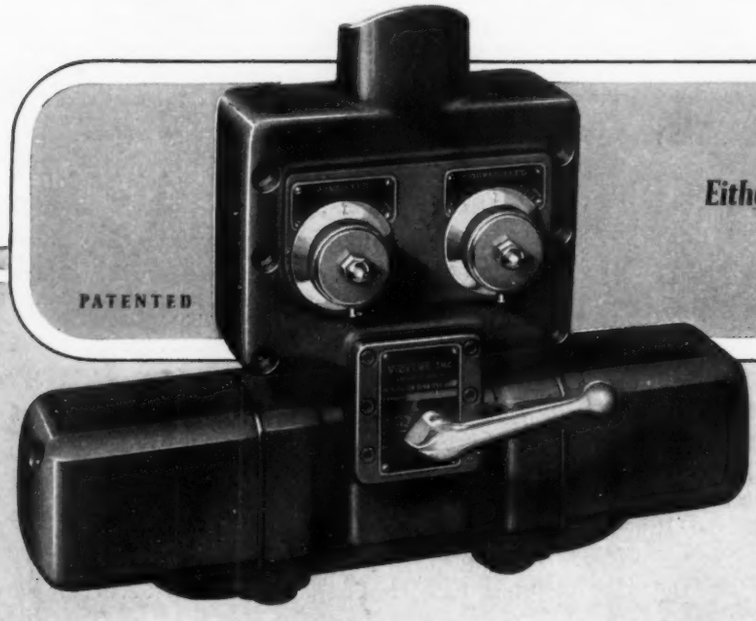
VICKERS *"Traverse and Feed"* CYCLE CONTROL PANELS

WITH INTEGRAL DOUBLE SOLENOIDS



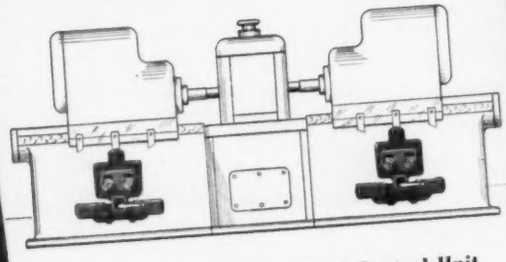
PATENTED

Push Button Operation

Either 1 or 2 Adjustable Feed Rates

Designed for Gasket Mounting

These panels provide self-contained, compact control units for automatic machine applications where the cycle is a combination of rapid advance, feed, and rapid return motions. The feed rates are infinitely variable within their range, and adjustments can be made during feed. For complete information ask for Bulletin 41-10.



A Complete Self-Contained Control Unit

for

DRILLING, REAMING, BORING, TURNING MILLING, SWAGING MACHINERY

SMOOTH AND CONSTANT FEED RATE

Regardless of Fluctuations in Work Resistance Or Operating Pressure . . . . . .

The hydraulic circuit in the panel employs the well-known Vickers Feed Control Valve and Locked Circuit combination. This insures longer tool life and better finish characteristics. These panels are designed to maintain uniform feed rate over a wide operating temperature range and the resulting oil viscosity change.

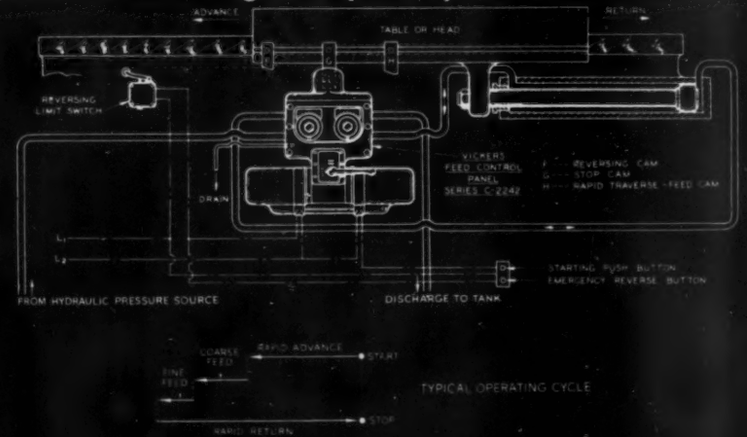
VICKERS *Incorporated*

1454 OAKMAN BOULEVARD • DETROIT, MICHIGAN

Typical Circuit Diagram Showing Simplicity of Installation

These panels are designed for manifold mounting on machine base or head. They can be easily dismounted by removing only six readily accessible socket head screws. Removal of panel does not disturb piping.

Many standard modifications are available; feeds can be in either direction or both directions. Practically any cycle sequence can be obtained.



Machine Tools

Boring Machines • Broaching Machines • Cut-Off and Filing Machines • Drilling and Reaming Machines • Gear Cutting and Finishing Machines • Grinding and Honing Machines • Lathes and Screw Machines • Milling Machines • Planers, Shapers and Slotters • Tapping and Threading Machines • Miscellaneous Machines

● AMERICAN MACHINIST'S 29TH ANNUAL BUYERS REFERENCE NUMBER

CLEVELAND *Open Side* PLANERS

"NEW SERIES" *displays advanced engineering as applied to modern planer construction*

• The New Series Cleveland Open Side Planers have been engineered to provide new improvements in design and construction that make for greater production—ease of operation—and lower costs and maintenance.

MODERN DEVELOPMENTS

Improved head design insuring greater rigidity for heavy cutting of high carbon steels.

Newly designed Rapid Traverse.

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Duplex Helical Drive to Bull Gear for greater, smoother power.

"ALL ELECTRIC" CLEVELAND OPEN SIDE PLANER . . .

This modern "All Electric" Tool provides the utmost in automatic control, speed and adaptability to close tolerance, high production planer operations.

Fully illustrated bulletin describes in detail the functions, construction and advanced design of the "New Series" Cleveland Open Side Planers.

Built in 7 sizes from 26" x 26" to 72" x 72"

The Cleveland Planer

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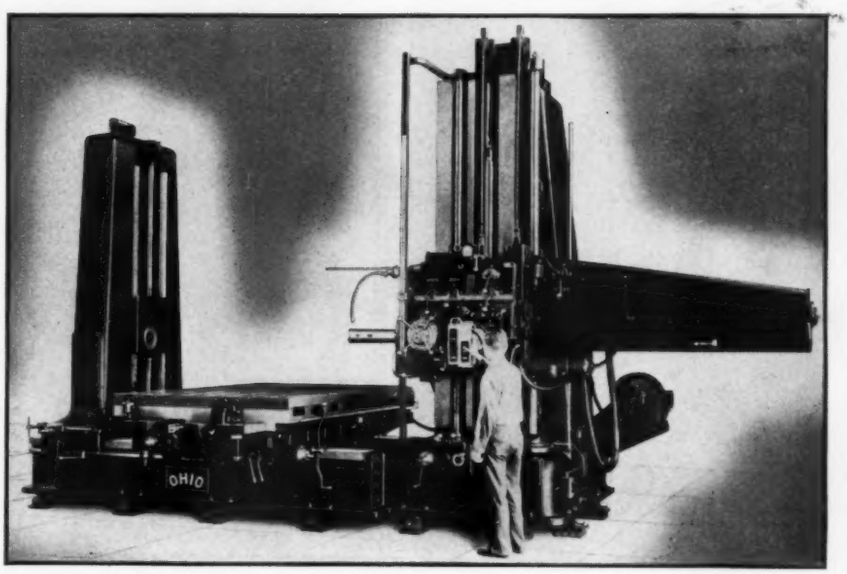
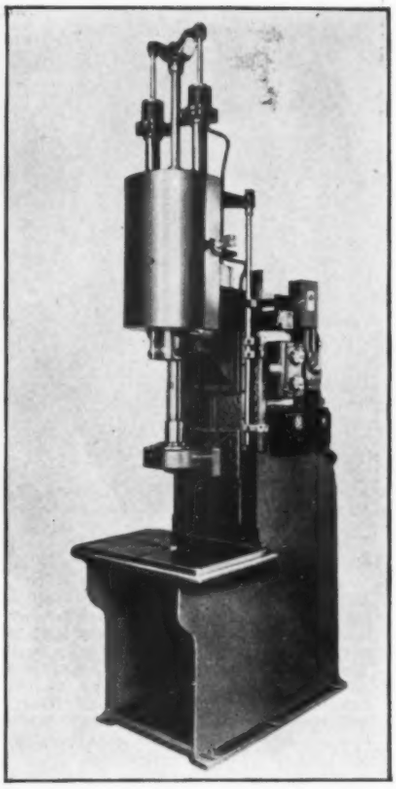
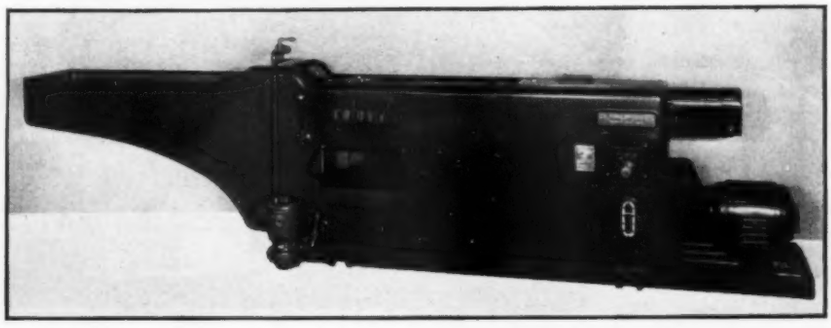
MACHINE TOOLS



BORING MACHINE—*Ohio Machine Tool Co., Kenton, Ohio.* A large horizontal boring, drilling and milling machine with a 72×132 in. table, a 60-in. bed and from 10 to 20 ft. between face-plate and bar support has been added to the Dreadnaught line. Vertical travel of spindle head is 96 in. and continuous spindle feed is 72 in. Spindle has maximum speed of 600 r.p.m. A similar floor-type machine also is available. Vol. 85, p. 1118.

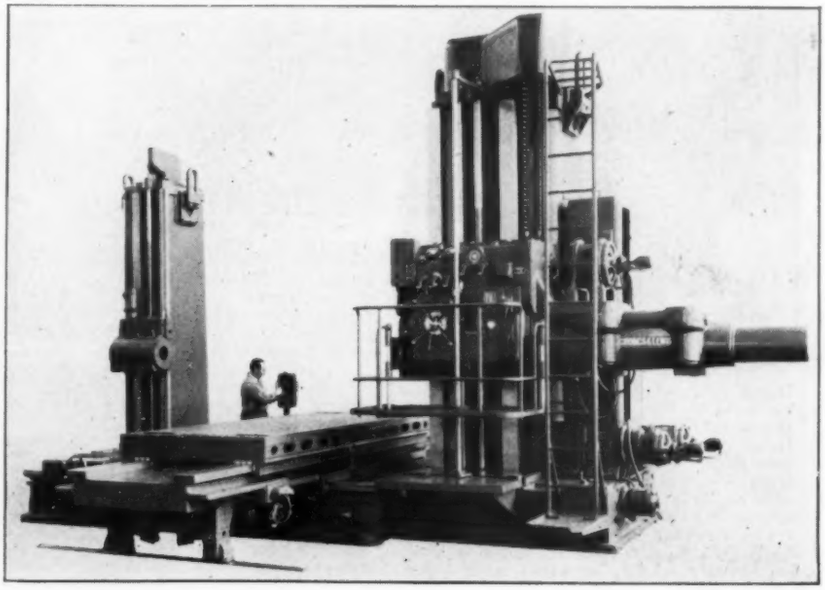




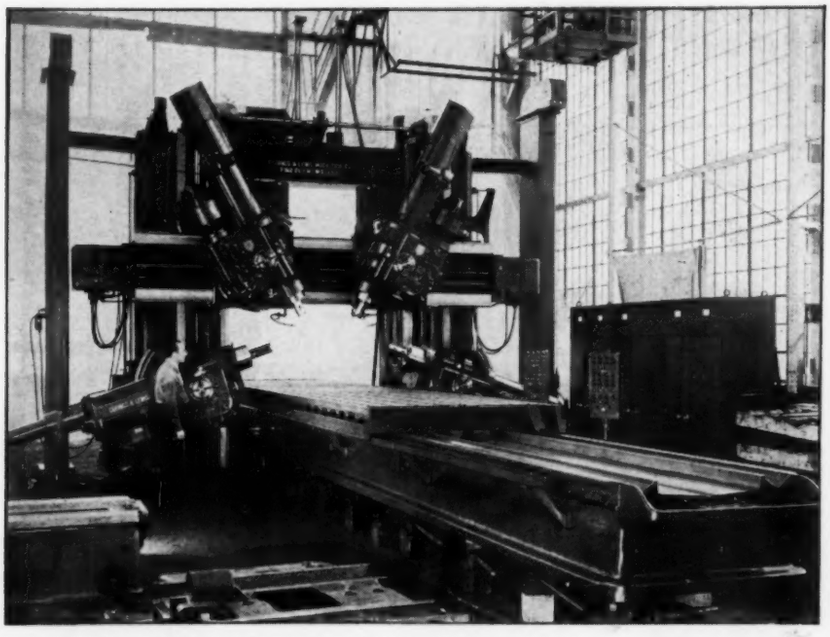
CARBIDEBORER — *Giern & Anholtt Tool Co., 1312 Mt. Elliott Ave., Detroit, Mich.* The Model 2V Carbideborer has been remodeled with a heavier column, a one-piece spindle saddle, electrical controlled dwell and electrical switch mechanism. An important feature of the machine is the revolving bushing, which is located immediately above the work. Boring capacity is ¾ to 3 in. diameter with 18-in. hydraulic spindle feed. Vol. 85, p. 1174.

HORIZONTAL BROACHING MACHINES—*Colonial Broach Co., 147 Jos. Campau St., Detroit, Mich.* Standard universal horizontal broaching machines range in capacity from 3 tons and 36-in. stroke to 25 tons and 90-in. stroke, with larger capacities available on special order. Features include a shockproof control mechanism and a readily accessible and increased vertical adjustment for the drive head to provide greater flexibility for off-center special broaching setups. Vol. 85, p. 509.

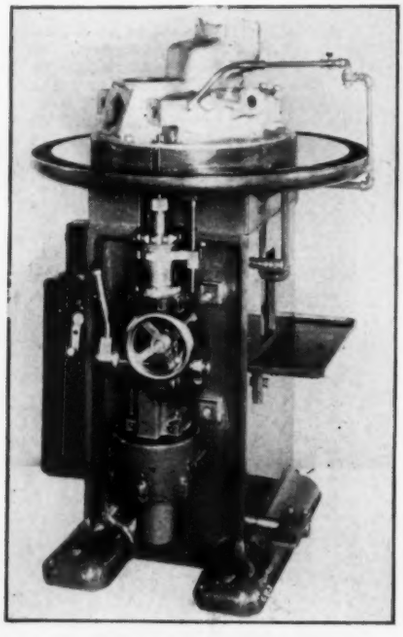
HORIZONTAL BORING MACHINE—*Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.* Series 50 horizontal boring, drilling and milling machines of large size have either 6 or 7 in. spindle operating in conjunction with a 2½ in. auxiliary spindle. The d.c. machines have five speed ranges from 1.5 to 300 r.p.m. for main spindle and from 6 to 1,200 r.p.m. for auxiliary spindle. The a.c. machine is practically the same, differing primarily in that 45 speeds are available to either main or auxiliary spindle. Standard 60×104 in. table has 84 in. cross travel. Vol. 85, p. 1237.



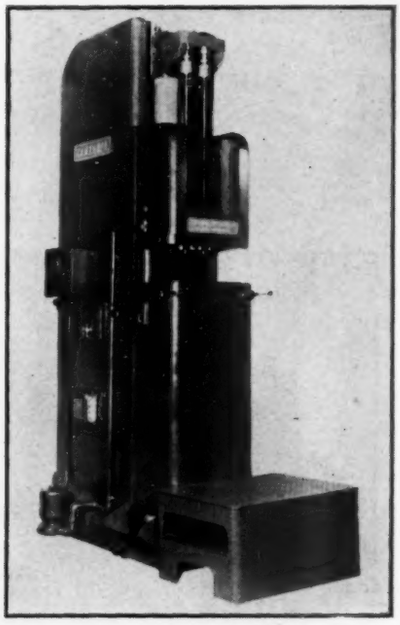
MACHINE TOOLS—Boring Machines



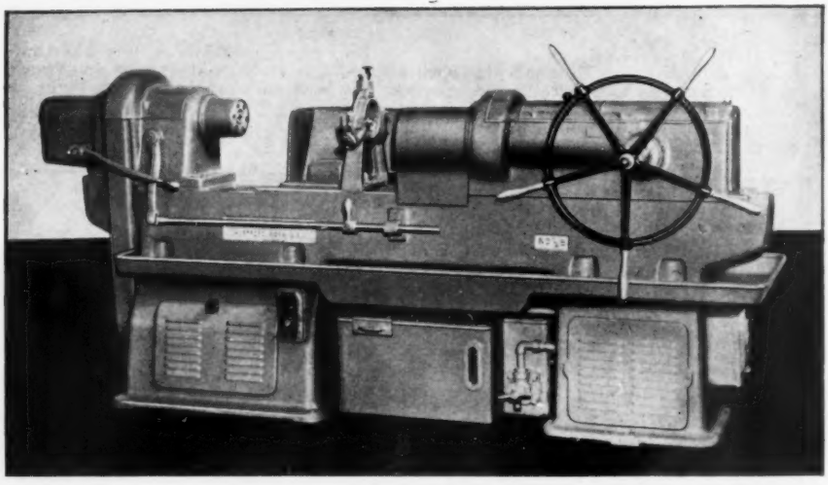
MULTIPLE HEAD BORING MACHINE—*Gidings & Lewis Machine Tool Co., Fond du Lac, Wis.* This Series 30 Multiple head planer type horizontal boring, drilling and milling machine has a table 6 ft. wide and 28 ft. 6 in. long with a travel of 26 ft. 6 in. on the 56 ft. bed. The machine has two side housings, an adjustable crossrail and four swiveling headstocks. Each headstock can be swiveled 30 deg. in either direction, and has a 4½ in. spindle and a 11½ in. quill. Vol. 85, p. 1237.



BACK SPOT FACING MACHINE—*Taft-Peirce Mfg. Co., 32 Mechanic Ave., Woonsocket, R. I.* For counterboring or facing bosses through a hole which has been drilled but which, because of an obstruction, cannot be counterbored on a drill press, this machine is furnished with speeds of 170 r.p.m. for steel and 300 r.p.m. for aluminum alloys. Feed is by hand. Maximum table diameter is 31½ in. Cutter spindle is under table. Vol. 85, p. 1348.

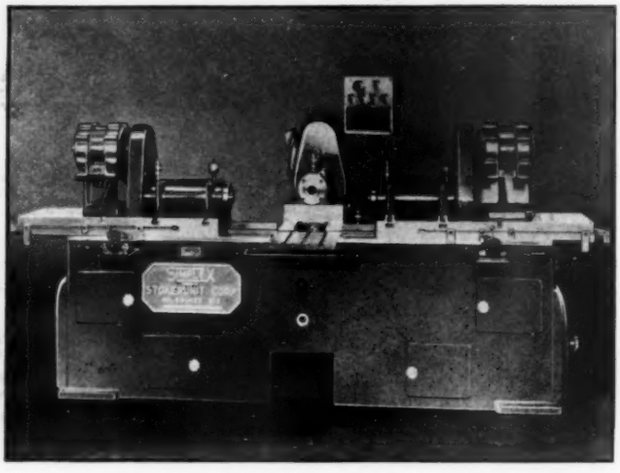


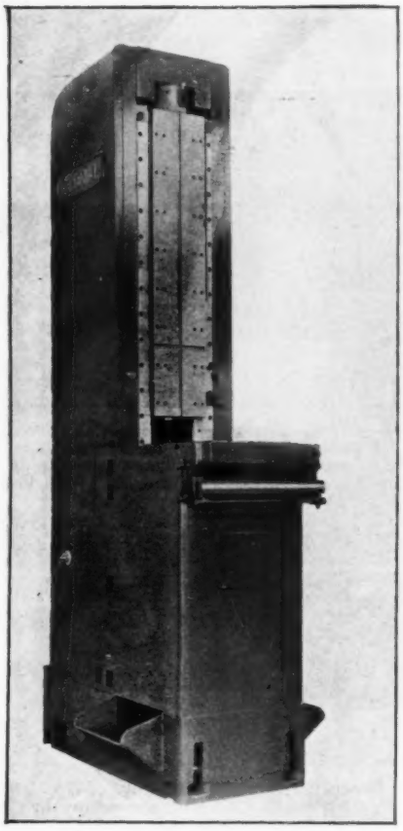
PULL-UP BROACHES — *Colonial Broach Co., 147 Jos. Campau St., Detroit, Mich.* Designed primarily to obtain maximum production in machining round and splined holes, new pull-up broaches range from 6 to 25 ton capacities. Vol. 85, p. 562.



GUN BARREL CHAMBERING MACHINE—*Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.* The No. ½B machine chambers the butt end of a previously drilled, reamed and rifled gun barrel. Outer end is supported in an adjustable lathe type steadyrest with spring operated jaws allowing the barrel to float in order to overcome eccentricity. The turret of the machine contains ten tool spindles, each fitted with an adapter adjustable endwise. The ten tools working successively complete the chamber. Vol. 85, p. 409.

PRECISION BORERS — *Stokerunit Corp., 4546 W. Mitchell St., Milwaukee, Wis.* Simplex unit type precision boring machines can be tooled up for precision boring and facing when using the Nos. 1, 1-L, 3 or 4 Simplex precision boring heads. Spindle speeds from 300 to 6,000 r.p.m. can be obtained with Nos. 1 and 1-L heads; 300 to 3,500 r.p.m. on No. 3 heads, and 200 to 2,500 r.p.m. on the heavy duty No. 4 head. Four beds are available. Vol. 85, p. 672.

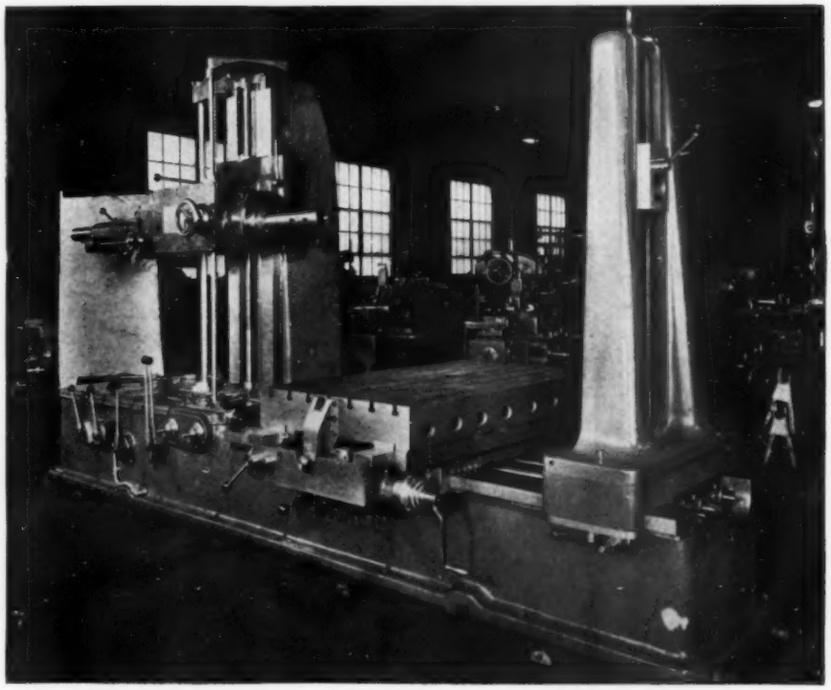




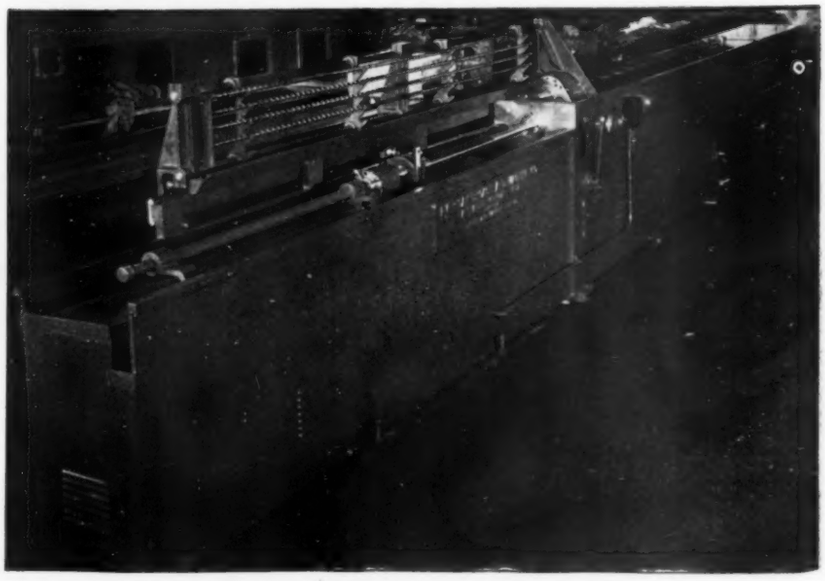
SINGLE RAM BROACHING MACHINE—*Colonial Broach Co.*, 147 *Jos. Campau St., Detroit, Mich.* Increased size of work table and ram, and adaptability to a wider range of tooling than formerly are features of streamlined designs of single ram broaching machines. Normal capacities of various sizes range from 3 tons and 36-in. stroke up to 25 tons and 66-in. stroke for the eleven standard models. Vol. 85, p. 777.

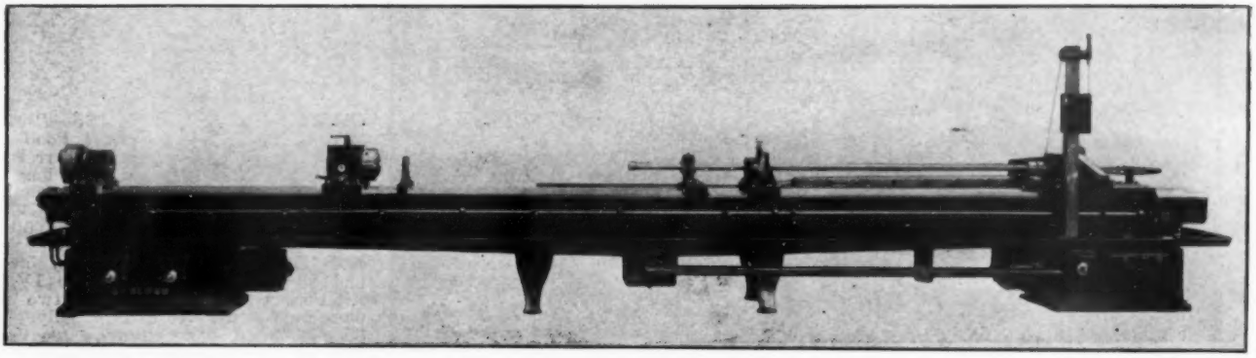
GUN RIFLING MACHINE—*American Broach & Machine Co., Div. of Sundstrand Machine Tool Co., Ann Arbor, Mich.* By using solid spiral broaches, 20-mm. cannon barrels can be broached in about ten minutes in four operations by four broaches. Broaches are approximately 48 in. long and can be serviced by ordinary broach grinding equipment. All have a short pilot at the starting end, the first broach having a plain round pilot and Nos. 2, 3 and 4 splined pilots. Operation is hydraulic. Vol. 85, p. 1240.

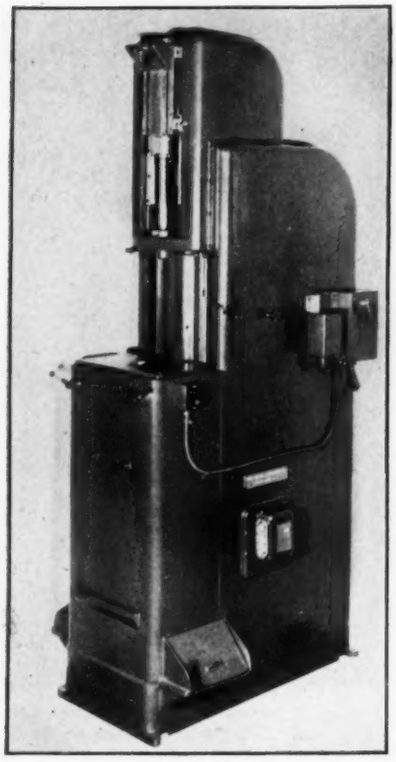
GUN RIFLING MACHINE—*The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio.* Grooves can be either cut or broached with this No. 2 gun rifling machine. Simplicity of mechanical features is an outstanding characteristic of this hydraulic machine, which is built to handle guns up to 3 in. bore, 88 in. in length. Adjustable automatic stops control carriage movement. Vol. 85, p. 184.



HORIZONTAL BORING MACHINE—*Portage Machine Co., Miami and Cross Sts., Akron, Ohio.* This horizontal boring, drilling and milling machine has an unusually wide and deep bed with integrally cast gear case and other features to meet demands for speed, rigidity and accuracy. Specifications: diameter of spindle, 4 in.; spindle traverse, 30 in.; speed range, 16 to 610 r.p.m.; feed per rev., 0.003 to 0.472 in.; cross travel of table, 48 in. Vol. 85, p. 673.

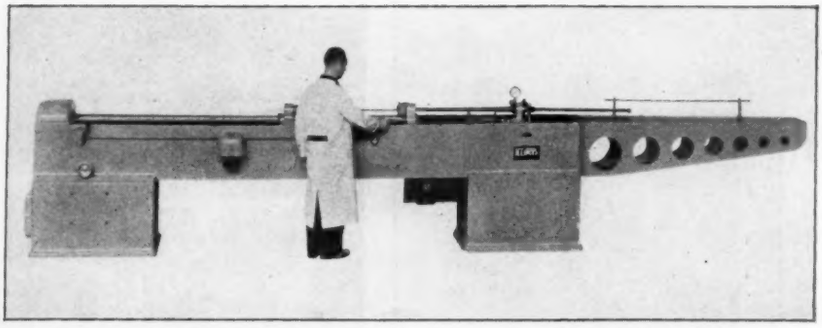




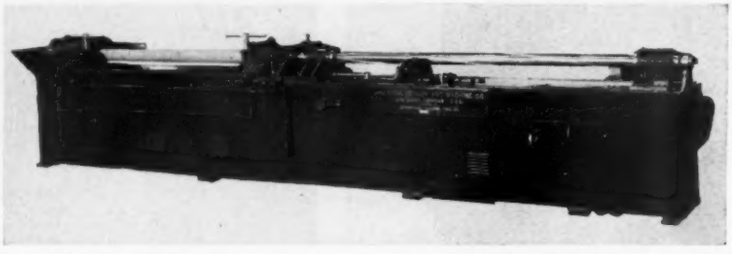


PULL-DOWN BROACHES — *Colonial Broach Co.*, 147 *Jos. Campau St., Detroit, Mich.* Pull-down broaching machines are now offered in standard sizes ranging 3 to 20 tons capacity and from 24 to 60-in. strokes. These machines are advantageous under conditions where damage may result from dropping of machine pieces and where indexing of the part to the broach is necessary. Speeds are variable, but are normally 30 ft. per min. down and 60 ft. per min. on the return stroke. Vol. 85, p. 313.

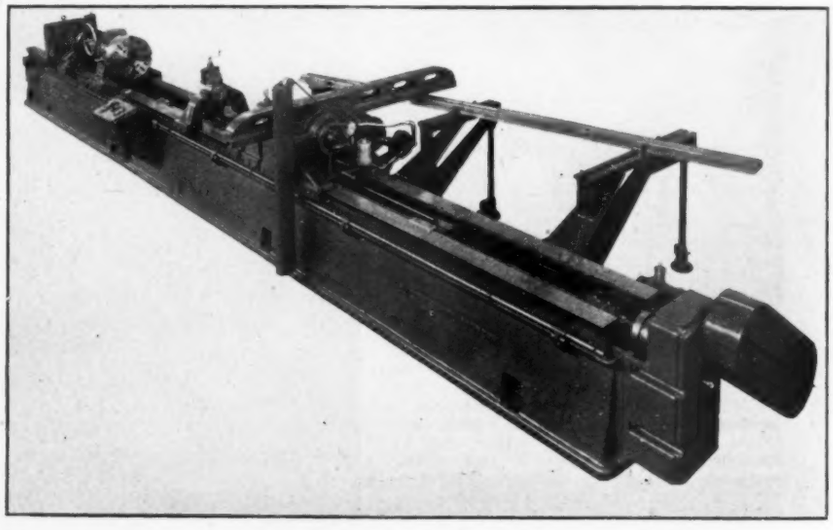
GUN RIFLING MACHINE—*Builders Iron Foundry*, 9 *Codding St., Providence, R. I.* Guards cover all moving parts of this rifling machine for 105-mm. gun barrels. Using a push type broach, it has cutting speeds of 10, 15 or 20 ft. per minute. Return speed is 30 ft. per minute. The machine is driven by a four speed motor through a vee belt at 600, 900, 1,200 and 1,800 r.p.m. Designed for barrels 156-in. long, the machine can be equipped for longer or shorter barrels. Adjustable sine bar permits cutting a spline of any desired pitch; can be removed after splining the rifling bars. Vol. 85, p. 1004.

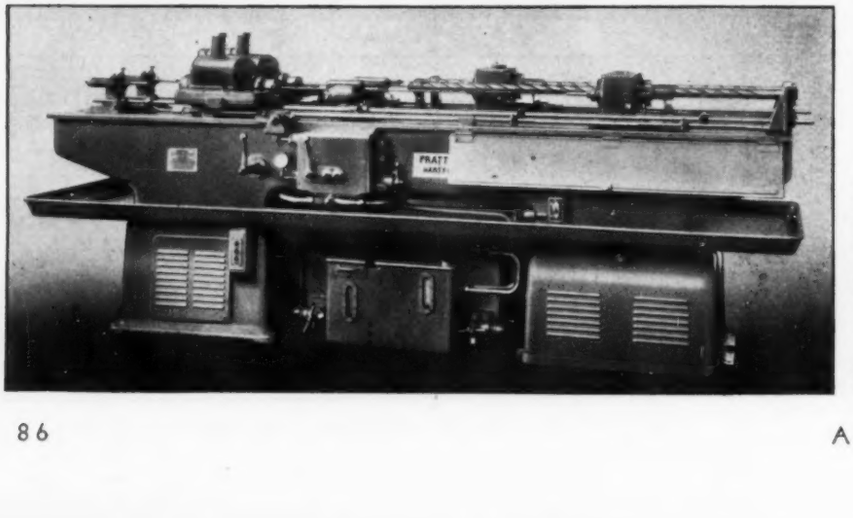


GUN RIFLING BROACHING SYSTEM—*Illinois Tool Works*, 2501 *N. Keeler Ave., Chicago, Ill.* Speed and accuracy of the broaching method has been brought to the rifling of machine gun and rifle barrels in a new broaching system. Elements of the system include broaches, broaching machines, broach sharpening machines and broach inspection fixtures. Vol. 85, p. 728.

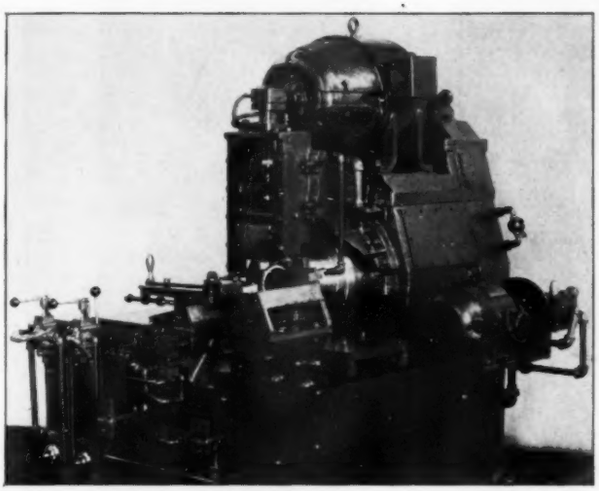


GUN RIFLING MACHINE—*American Broach & Machine Co., Div. of Sundstrand Machine Tool Co., Ann Arbor, Mich.* This hydraulic gun rifling machine broaches rifling grooves of constant helix in gun barrels. Each cutter has a slightly increased diameter over the preceding one so as to take chips approximately 0.001 to 0.002 thick. Master lead bar is hollow so coolant can be delivered to the cutting tool. Work is clamped between soft split bushings. Specifications: capacity, 12 tons; cutting speed, 15 ft. per min.; return speed, 30 ft. per min. Vol. 85, p. 199.





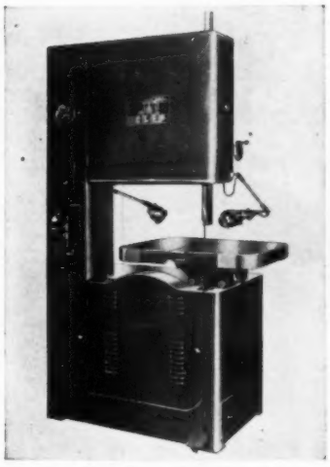
GUN RIFLING MACHINES—*Pratt & Whitney Div., Niles Bement Pond Co., West Hartford, Conn.* Gun barrels up to 1⅛ in. in diameter and 98 in. long can be rifled with the No. 1B×98 gun barrel rifling machine. Two No. ½B machines handle lengths of 30 and 50 in. with diameters up to ⅝ in.; while three No. 1B units handle lengths of 50, 74 and 98 in. at diameters up to 1⅛ in. All these machines incorporate two complete units controlled hydraulically. Vol. 85, p. 359.



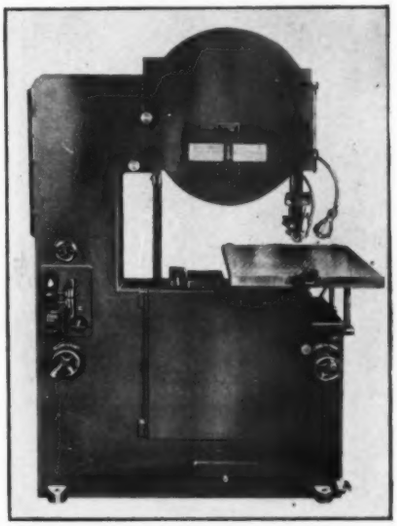
CUTTING-OFF MACHINE—*Taylor-Wilson Mfg. Co., McKees Rocks, Pa.* This hydraulic cutting-off machine is available in several sizes to handle solid and tubular stock in diameters from ¾ to 20 in. The machine can be used for cutting off shell blanks from seamless tubing. Hydraulic controls are used throughout. Vol. 85, p. 266.

CONTOUR SAW—*Continental Machines, Inc.*, 1301 *Washington Ave. South, Minneapolis, Minn.* This Model V-60 band sawing and filing machine has a throat depth of 5 ft. and will accommodate work up to 10 ft. Work up to 12 in. thick can be cut with blades from 1/16 to 1 in. in width. Hydraulic contour feed control is used with the power feed. Variable speeds are from 50 to 1,500 ft. per min. Vol. 85, p. 133.

HYDRAULIC HACKSAW—*L. B. Mfg. Co., P.O. Box* 155, *Vernon, Los Angeles, Calif.* Hydraulic hacksaw with infinite number of speeds rises hydraulically to the highest point on completion of cut. It feeds under constant pressure. Graduated vise has a 45 deg. swiveling jaw. Integral coolant pump is sychronized with blade motion. Vol. 85, p. 1349.

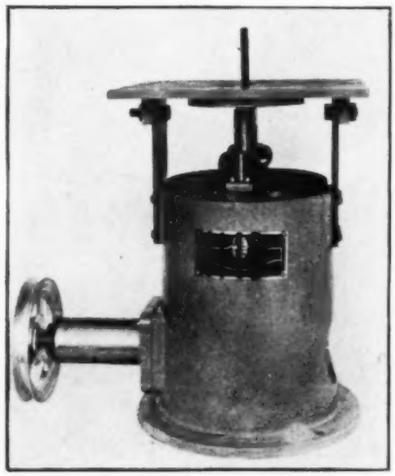


COMBINATION SAWING-FILING MACHINE—*Grob Bros., Grafton, Wis.* The Model No. NS-24 combination band sawing and chain filing machine provides a throat of 24 in. by use of two 24½-in. diameter pulleys. Vol. 85, p. 197.

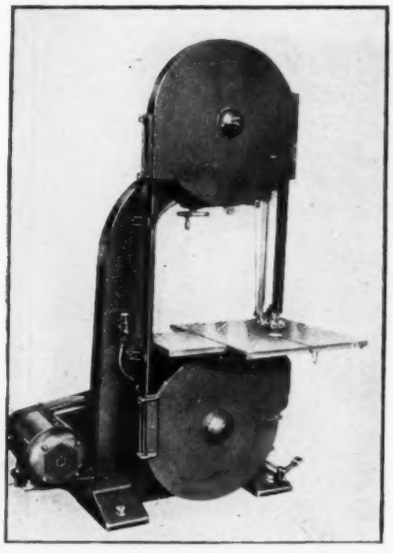


BANDSAW AND FILER—*Tannewitz Works, Grand Rapids, Mich.* Built along the lines of the standard No. 24-M model, this "Di-Saw" is provided with a 30-in. throat for handling larger work. Similar machines with throat capacities up to 48 in. can be supplied. Vol. 85, p. 629.

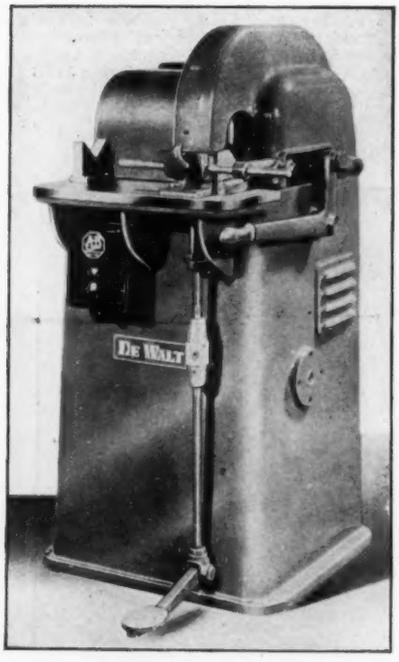
FILING MACHINE—*Grob Bros., Grafton, Wis.* Many features of larger machines are incorporated in the No. FB-18 light-duty filing and lapping machine which has an 18 in. throat and is capable of production to within an accuracy of 0.001 to 0.002 in. Vol. 85, p. 198.



BENCH-TYPE FILER—*Engineering & Sales Co.*, 1821 *Cleveland St., Hollywood, Fla.* A bench-type machine for filing dies, gages, templets, irregular shaped holes and slots, has been designed with a steel plate table measuring 8 × 8¾ in., which can be tilted to either side. Vol. 85, p. 1170.

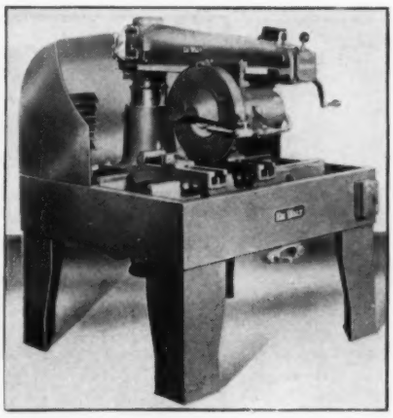


BANDSAW—*Tannewitz Works, Grand Rapids, Mich.* This special 36-in. bandsaw was designed especially for sawing magnesium blocks 30 in. thick. Similar machines built with special welded steel frames are available in any capacity up to those carrying 52-in. wheels. Vol. 85, p. 453.



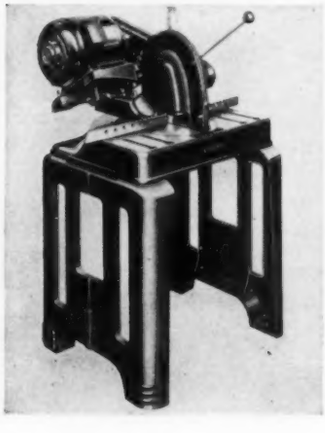
METAL-CUTTING MACHINE—*DeWalt Products Corp., Lancaster, Pa.* A high-speed metal-cutting machine for round or square bars or tube stock of brass, bronze, copper, aluminum, duralumin, or light steel is recommended for 2-in. diameter solids, and up to 4-in. sections. Cutter is fed toward work by downward motion of handle. Vol. 85, p. 1348.

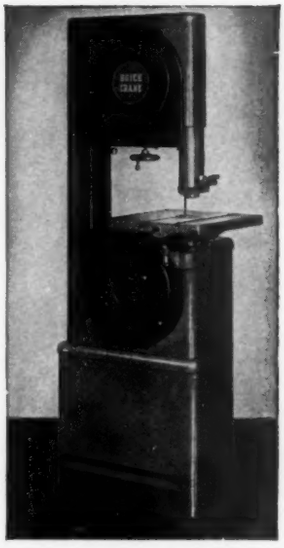
CUT-OFF MACHINE—*Delta Mfg. Co., 600-634 E. Vienna Ave., Milwaukee, Wis.* All non-ferrous metals can be cut quickly and smoothly at any angle with this cut-off machine. When special blades are used, this machine will cut brass, aluminum and copper up to 1½ in. in diameter, and tubular sections up to 2 in. in diameter. Vol. 85, p. 197.



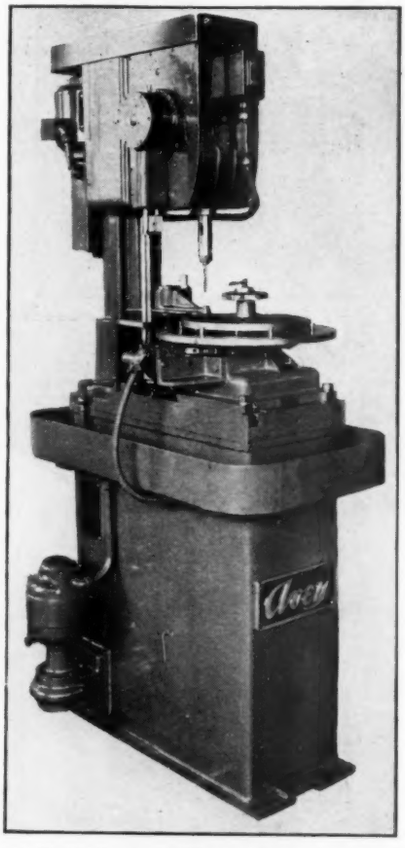
METAL CUTTER—*DeWalt Products Corp., Lancaster, Pa.* Machine for straight cutting metal 4 in. thick by 12 in. wide, powered with a 10 hp., 1,800 r.p.m. electric motor, will also make 45 deg. angle cuts in material 4 in. thick by 8 in. wide. Cantilever arm carries the motor on a bronze slide block that travels back and forth. For making angle cuts the cantilever arm can be swung right or left 45 deg. and locked in any position. Vol. 85, p. 1345.

METAL-CUTTING SAW—*J. D. Wallace & Co., 134 S. California Ave., Chicago, Ill.* The No. 1 metal-cutting saw employs either ¾ in. abrasive wheels or special metal-cutting saw blades. In addition to straight cut-off work, this machine is quickly set up for angle cuts. Vol. 85, p. 272.

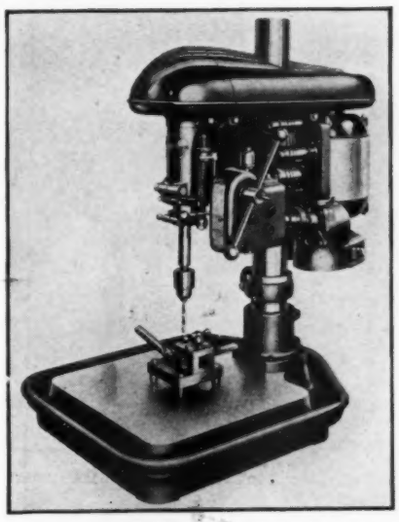




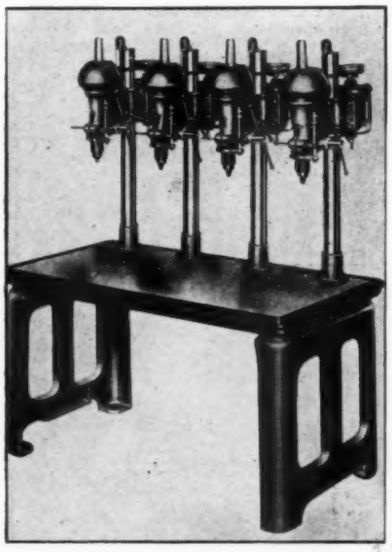
BANDSAW—*Boice-Crane Co., 1730 Norwood Ave., Toledo, Ohio.* Single-speed, 1,200 r.p.m. models with direct-connected motors in both bench and floor types, V-belt drive bench models and a model having eight speeds from 25 to 1,120 r.p.m., are available in the No. 2300 14-in. "Hi-Speed" metal cutting bandsaw. Vol. 85, p. 197.



AUTOMATIC DRILLER—*The Avey Drilling Machine Co., Cincinnati, Ohio.* Operator loads part and pushes starting button of this automatic machine for drilling small, evenly spaced holes such as the turbine blade pin holes in turbine wheels. Machine drills one hole at a time and indexes on the back stroke of the cam feed to complete as many holes as required. Vol. 85, p. 1292.



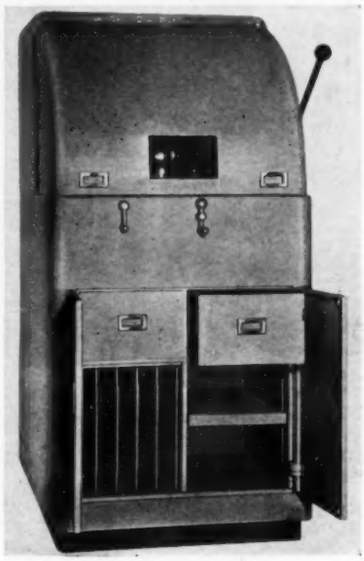
DRILL PRESSES—*Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee, Wis.* Power feed of these drill presses, which include single and multiple spindle 17 in. machines, operates directly off the bottom drive of the motor instead of spindle. Feeds from 0.001 to 0.016 in. per rev. of spindle are obtained in the slow speed presses and from 0.005 to 0.009 in. per rev. in the high-speed machines. Vol. 85, p. 1168.



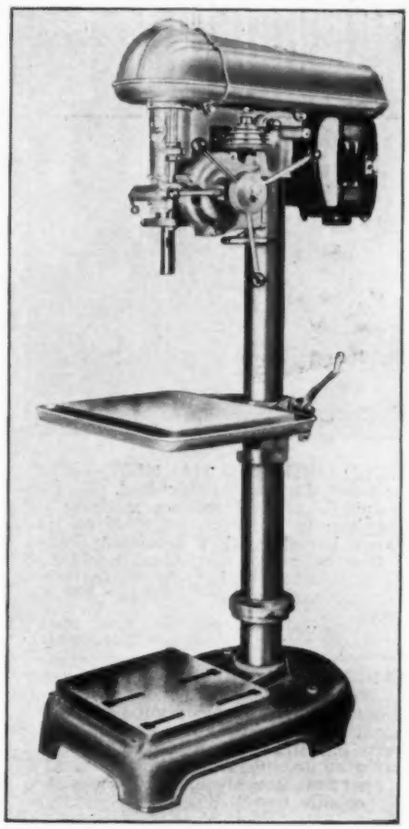
MULTIPLE-SPINDLE DRILL—*Duro Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill.* A multiple-spindle drill press for light drilling and tapping is available with either two or four spindles which run in permanently lubricated ball bearings. Four-spindle table measures 20½×50 in. Distance between spindles is 12 in.; from chuck to table, 26 in. Chucks take up to ⅝-in. drills. Vol. 85, p. 266.

DRILL PRESS — *Walker-Turner Co., Plainfield, N. J.* Four rates of feed are provided for each of the five spindle speeds of this 20 in. drill press. Available in single or four spindle models with power, hand or foot feed. Will handle drilling and reaming operations from 1 in. to ⅛ in. cast iron. Vol. 85, p. 1344.

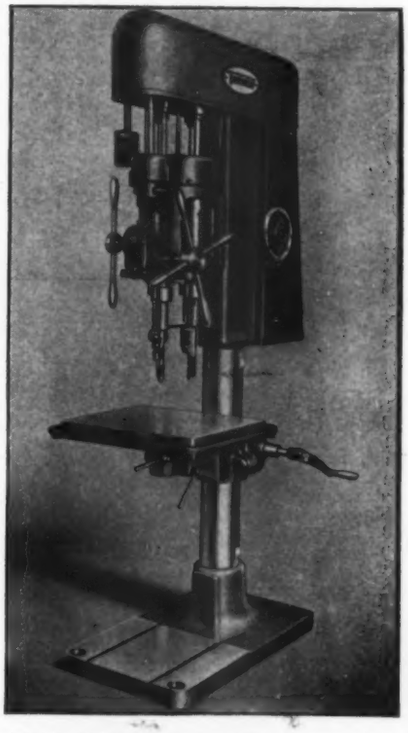
WET ABASIVE CUT-OFF MACHINE —*Manhattan Rubber Mfg. Div., Raybestos-Manhattan, Inc., Passaic, N. J.* Coolant is delivered from a 95-gal. tank to both sides of the wheel through grooves in the face of both flanges in the Jacobsen "lightning cut" wet abrasive cut-off machine. Not shown. Vol. 85, p. 1018.



ABRASIVE CUT-OFF MACHINE—*Adolph I. Buchler, 228 N. LaSalle St., Chicago, Ill.* Cutting is done at the front of the wheel, rather than the bottom, with this abrasive cut-off machine thus permitting sectional cutting without the necessity of a hydraulic feed. The machine is completely inclosed. Vol. 85, p. 1021.

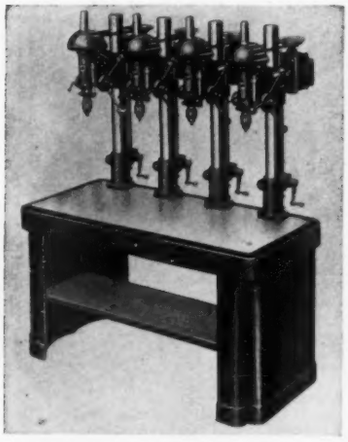


BURRING MACHINE—*Pines Engineering Co., St. Charles, Ill.* The mechanical-electrical arrangement of this horizontal spindle burring machine for performing reaming, burring, facing, threading or honing operations on the ends of tubing and rods, gives production speeds up to 1,200 pieces per hr. on some classes of work. Vol. 85, p. 629.

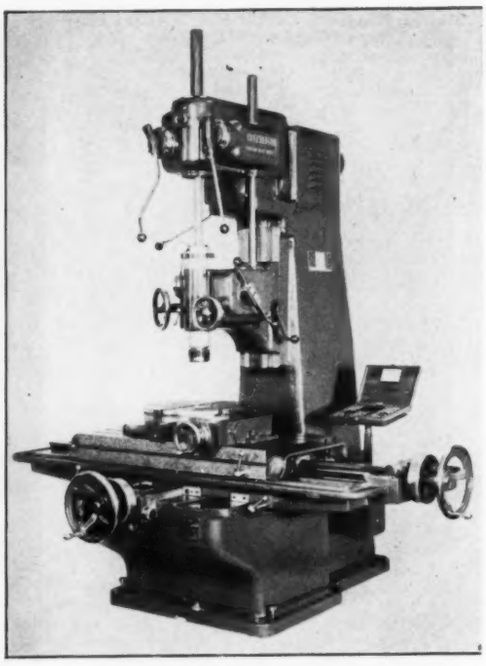


TURRET DRILL PRESS—*Turner Machine Co., Danbury, Conn.* The turret of this four-spindle drill press is carried on a vertical spindle, about which it revolves horizontally to index the different spindles into working position. For drilling, three of the spindles have a speed range of 250 to 1,620 r.p.m. and the spindle for tapping has a range of 85 to 540 r.p.m. The machine has capacity for drills up to 29/32 in. and taps up to ½ in. Turret is indexed by hand. Work table can be titled or moved aside. Vol. 85, p. 673.

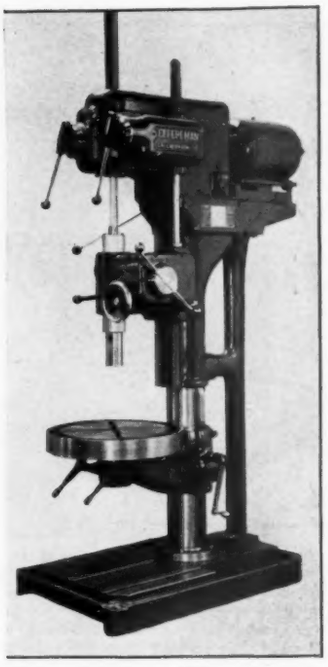
MACHINE TOOLS—Drilling and Reaming Machines



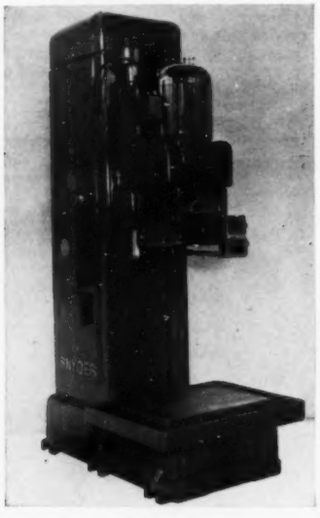
MULTIPLE-SPINDLE DRILL—*Atlas Press Co., Kalamazoo, Mich.* These multiple-spindle drilling machines, with two, three or four spindles, are recommended for all types of small hole drilling and tapping. Maximum distance, table to chucks, 26 in.; columns to center of spindles, 7½ in.; spindle travel, 4 in. Vol. 85, p. 199.



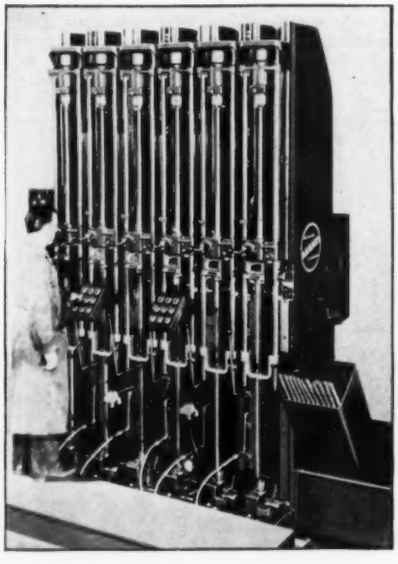
JIG BORER—*Bryant Machinery & Engineering Co., Sales Div. of Cleereman Machine Tool Co., 400 W. Madison St., Chicago, Ill.* Recent improvements in this jig borer provide increased speed, accuracy and ease of operation. This machine is available in three table sizes: 16×30, 16×36 and 22×44 in. Rotary tables are made in 16- and 20-in. diameters. Vol. 85, p. 87.



DRILLING, BORING AND TAPPING MACHINE—*Bryant Machinery & Engineering Co., Sales Div. of Cleereman Machine Tool Co., 400 W. Madison St., Chicago, Ill.* An outstanding improvement on this high-speed drilling, boring and tapping machine is a powerful feed clutch. Ground feed worms reduce friction, prolong life. Machines are made in 21, 25 and 30 in. sizes. Vol. 85, p. 87.

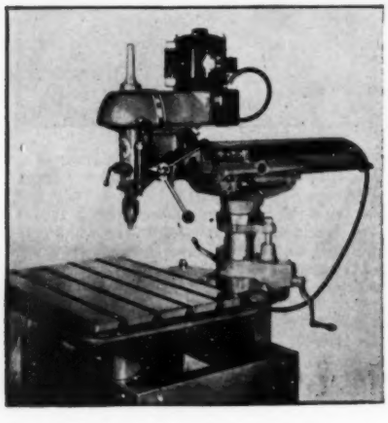


DRILLING MACHINES—*Snyder Tool & Engineering Co., 3400 E. Lafayette St., Detroit, Mich.* Two upright drilling machines have been developed for production work requiring multiple-spindle heads. No. 10V18 unit will drill one 4 in. hole in mild steel or will drive ten 1-in. drills at 90 ft. per min. in cast iron. No. 20V16 machine drills one 5-in. hole or ten 1¼-in. holes. Vol. 85, p. 198.

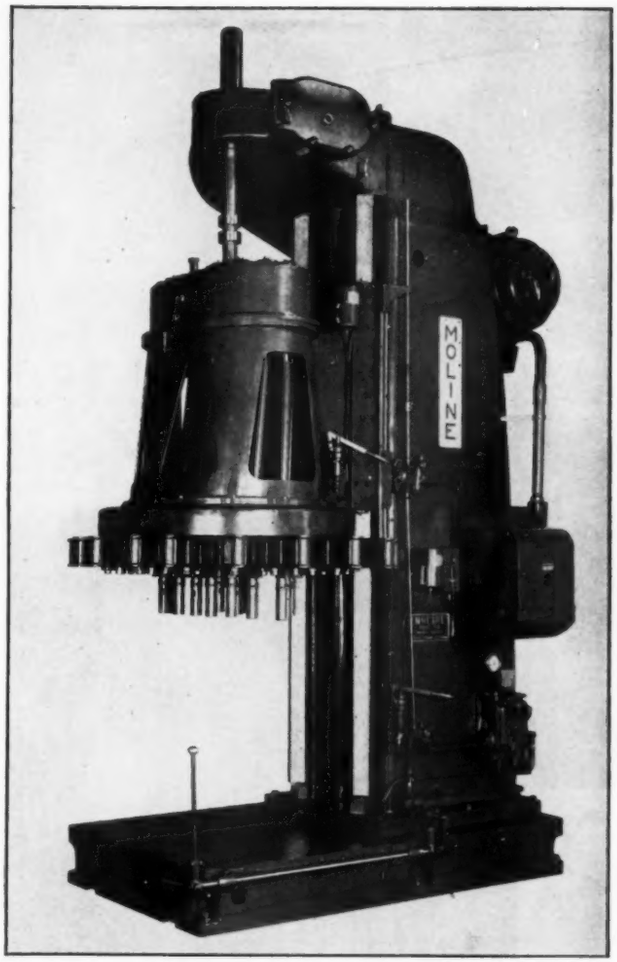


RIFLE DRILLING MACHINE—*W. F. and John Barnes Co., Rockford, Ill.* This six-spindle vertical drilling machine for rifle barrels handles either .30-cal. or .50-cal. barrels with a maximum length of 45½ in. and a maximum diameter of 1¾ in. Revolving barrels are fed down over stationary single-lip drills. Vol. 85, p. 627.

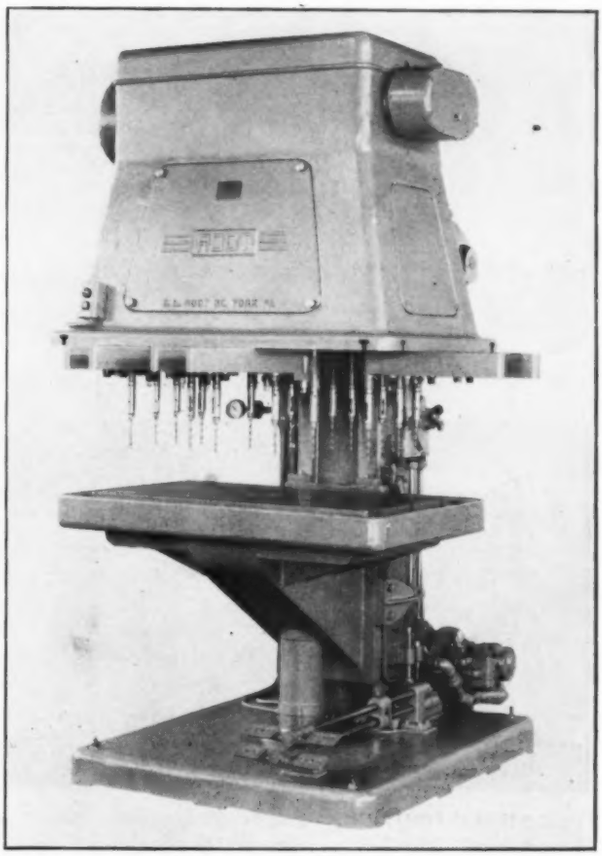
RADIAL-ARM DRILLING AND TAPPING MACHINE—*Bausch Machine Tool Co., Springfield, Mass.* This combination radial-arm drilling and tapping machine carries out both operations with minimum time required for changeover. It is intended for all classes of single-spindle work where ease of head manipulation for targeting and accuracy of work produced are essential. When the start button is pushed the spindle revolves and feeds to a predetermined depth. Vol. 85, p. 511.



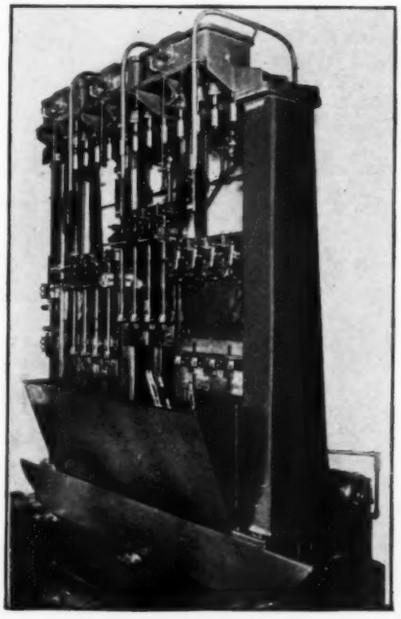
← RADIAL-ARM DRILL—*Walker-Turner Co., 602 Berckman St., Plainfield, N. J.* This radial drill for performing light duty operations is suited for work in the aircraft industry. Ram travel, 18 in.; maximum distance of chuck to table, 13½ in.; vertical movement of drill head, 8½ in.; spindle travel, 3¾ in.; capacity of chuck, ½ in. Vol. 85, p. 263.



MULTIPLE-SPINDLE DRILL—*Moline Tool Co., Moline, Ill.* The No. 116-U multiple-spindle drilling machine is larger and heavier and has considerably greater drilling capacity than previously-built units of the same type. Each of the 16 spindle drivers is adjustable for either of two rotational speeds or neutral. Two motors are used, one to drive the spindles, and the other to drive the hydraulic feed unit. Specifications: vertical spindle adjustment, 2¼ in.; working stroke of hydraulic feed cylinder, 36 in. Vol. 85, p. 32.

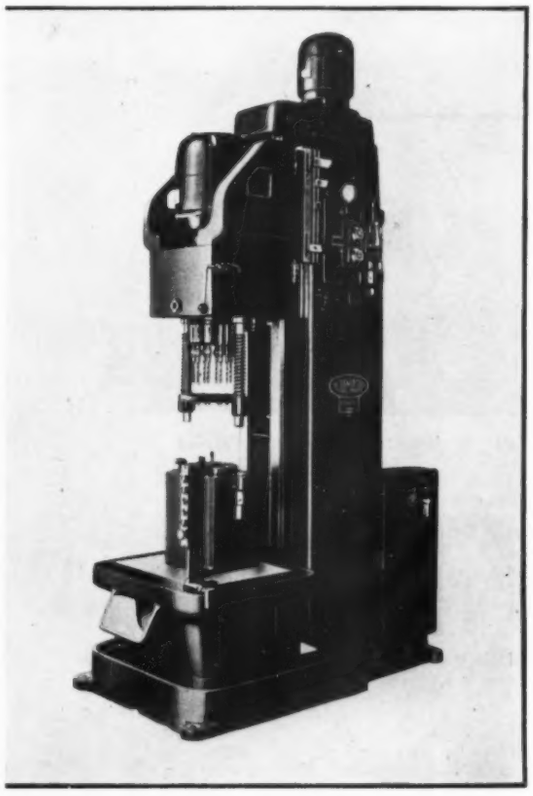


MULTIPLE-SPINDLE DRILL—*B. M. Root Co., York, Pa.* Designed to drill a large number of regularly or irregularly spaced holes in an 18 × 36 in. area, the Style F400 multiple-spindle drill has automatic, continuous or intermittent feed strokes with hydraulic table feed. Vol. 85, p. 779.

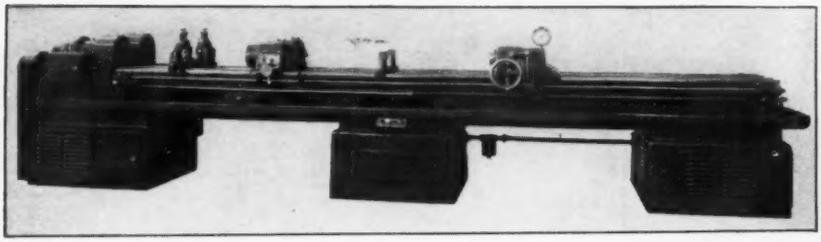


→ MULTIPLE-SPINDLE DRILLS—*The Bradford Machine Tool Co., 657 Evans St., Cincinnati, Ohio.* Two "Holemaster" machines, whose standardized elements can be changed and rearranged for most types of drilling and boring, have been developed. Both single-spindle and multiple-spindle models have interchangeable tables. Vol. 85, p. 898.

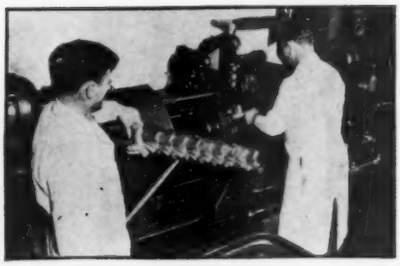
← DEEP-HOLE REAMING MACHINE—*W. M. Steele Co., 98–100 Beacon St., Worcester, Mass.* Push and pull reaming of .30 or .50 cal. rifle barrels can be performed with this vertical, multiple-spindle, long-hole reaming machine. The No. 1, .30 cal. machine, takes barrels from 22 to 28 in. long. The No. 2 for .50 cal. barrels handles 36 to 46 in. pieces. Spindles are grouped in fours. Vol. 85, p. 995.



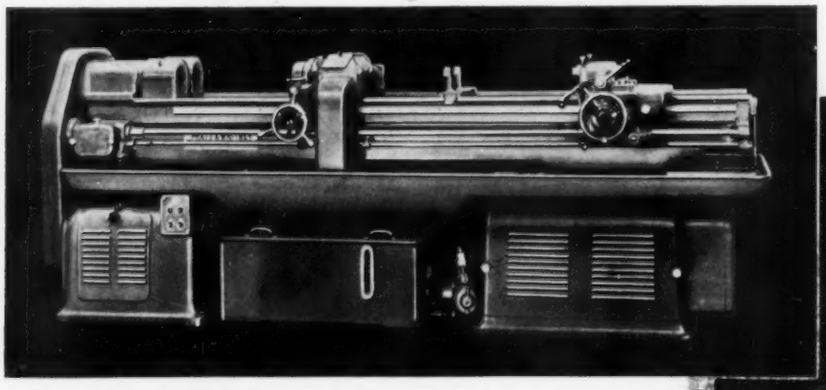
MACHINE TOOLS—Drilling and Reaming Machines



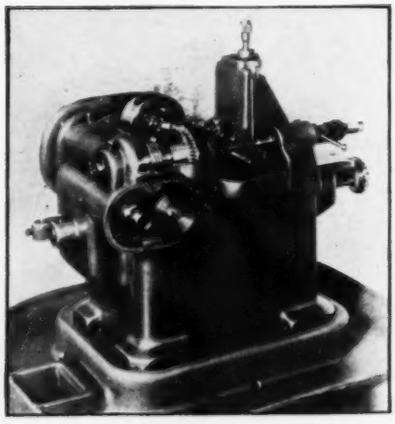
DEEP-HOLE DRILLER—*Builders Iron Foundry, 9 Codding St., Providence, R. I.* Each spindle of this double-spindle machine for deep-hole drilling gun barrels from the solid is driven by a separate 3-hp. motor. The machine also can be used for either draw-type or push-type reaming and boring. It has six-spindle speeds from 175 to 1,090 r.p.m. and can be arranged for any specified speed desired. For drilling there are 11 feeds ranging from 0.0005 to 0.003 in. per revolution. For reaming 11 speeds range from 0.00035 to 0.02 in. per revolution. Vol. 85, p. 1346.



AUTOMATIC DRILLER AND BORER—*Merz Engineering Co., 200 S. Harding St., Indianapolis, Ind.* This machine, automatic except for loading and unloading, drills, reams, spot-faces and countersinks holes in track links 12, 15 or 18 in. long for gun tractors and artillery tanks. The assembled machine, weighing 8½ tons, is approximately 14 ft. long, 8 ft. deep, and 7 ft. high. Vol. 85, p. 1287.

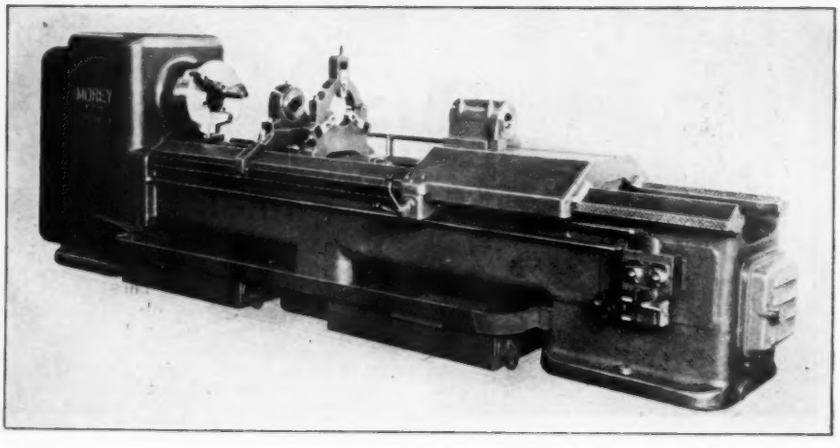


DEEP-HOLE DRILLERS—*Pratt & Whitney Div., Niles Bement Pond Co., West Hartford, Conn.* Nos. ½B and 1B deep hole drillers for rifle barrels and hollow spindles are capable of handling a wide range of work. Each machine is arranged so that the twin drilling units can be operated independently. Holes ⅝ in. in diameter up to 50 in. long can be drilled with the No. ½B, while holes 1 in. in diameter up to 74 in. long can be drilled with the No. 1B. In these machines, the single-flute drills remain stationary while work revolves. Vol. 85, p. 358.

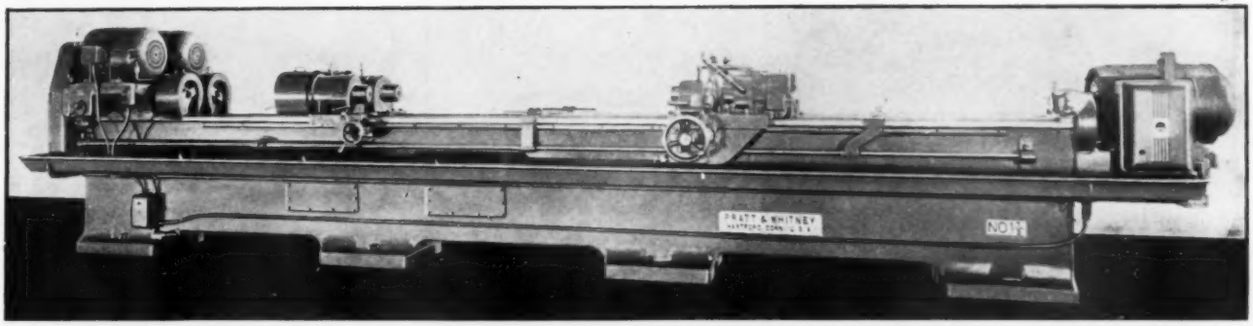


DRILLING MACHINE—*Sibley Machine & Foundry Corp., South Bend, Ind.* The 25-in. swing all-geared drilling machine is designed for both toolroom and production work. Spindle speed range is 75 to 1,500 r.p.m. with 12-in. spindle travel by power. Feeds range from 0.005 to 0.045 in. Over-all height is 9 ft. 6 in. Maximum distance of spindle to the base is 33 in. Working surface of the table measures 18½×24 in. Vol. 85, p. 453.

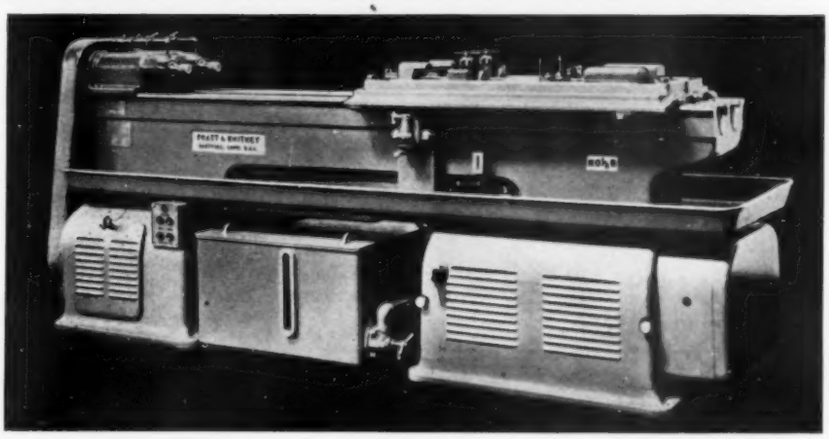
SPUR GEAR HOBBER—*Triplex Machine Tool Co., 125 Barclay St., New York, N. Y.* The American Micron spur gear hobbing machine has a capacity for spur gears and pinions up to 2 in. in diameter, and a maximum cutting length of 1.6 in. Change gears are supplied for six feeds between 0.004 and 0.030 in. per rev. of the hob, and are available for between 6 and 390 teeth. Vol. 85, p. 166.



DEEP-HOLE DRILLER—*Morey Machinery Co., 410 Broome St., New York, N. Y.* With two levers in the operator's position that control the entire operation, this 27-in. deep hole drilling and reaming machine has been designed especially for drilling, boring and reaming 155-mm. gun recoil cylinders and gun barrels. Vol. 85, p. 568.

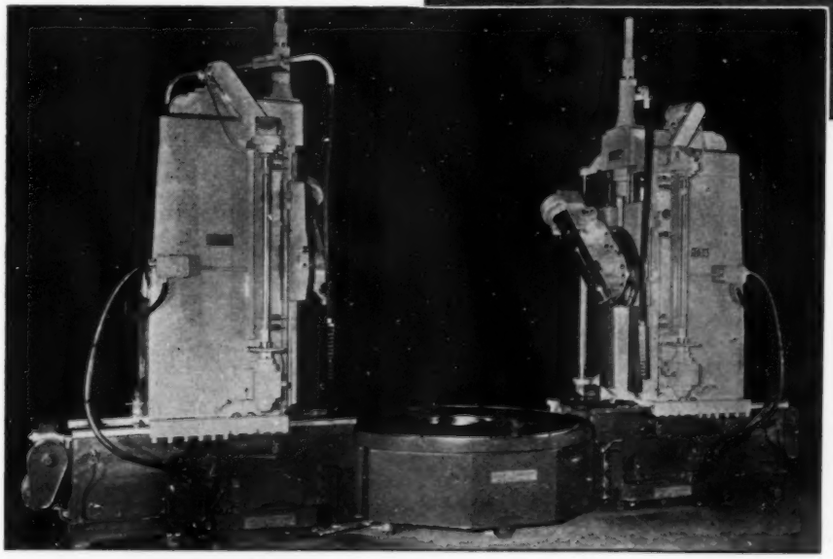


DEEP-HOLE DRILLER — *Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.* Extremely long holes as large as 2 in. in diameter in many types of work can be drilled accurately with the No. 1½ deep hole drilling machine. The machine is a twin unit, designed to drill two pieces simultaneously. The operator can reload and start one spindle while the other is drilling. Drills remain stationary while work revolves. Drill carriage has both hand and power feeds. Vol. 85, p. 405.



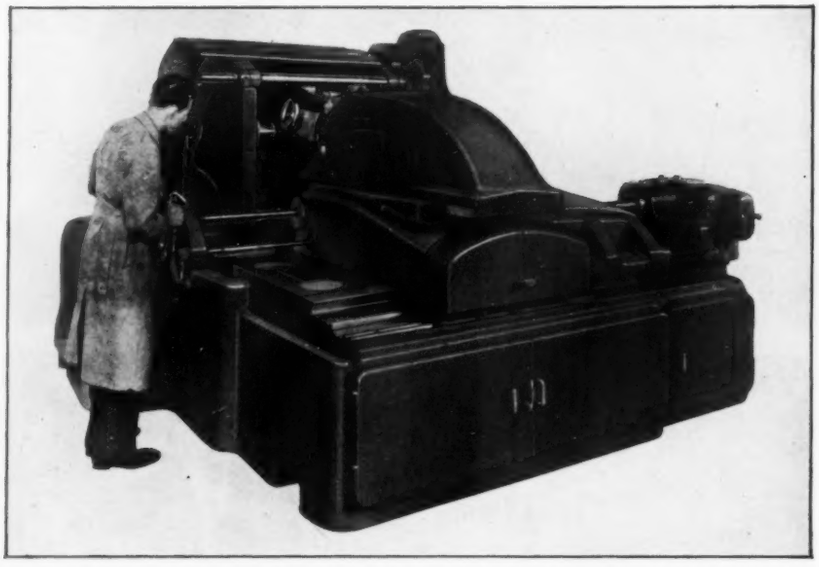
DEEP-HOLE REAMER — *Pratt & Whitney Div., Niles Bement Pond Co., West Hartford, Conn.* Capable of handling work up to ⅝ in. diameter 50 in. long, and 1 in. diameter 74 in. long respectively, Nos. ½B and 1B deep-hole, double-spindle reamers are recommended for any type of deep hole reaming. They were developed primarily for reaming rifle barrels. Work is held in fixture on the carriage and this unit is fed toward or away from the rotating reamer. Hydraulic feed range is 2 to 10 in. per min. with 30 ft. per min. rapid return of carriage. Vol. 85, p. 364.

RIFLE DRILLING MACHINE—*W. F. and John Barnes Co., Rockford, Ill.* The two-spindle No. 410 drilling machine, designed primarily for rifle barrel drilling, is suited to horizontal deep hole drilling of any parts which are diametrically balanced. The two-spindle, hydraulically actuated headstock is mounted on 10-in. ways. Capacity of the machine is .50-cal. maximum. Available with strokes of 24, 36 and 48 in. Vol. 85, p. 627.

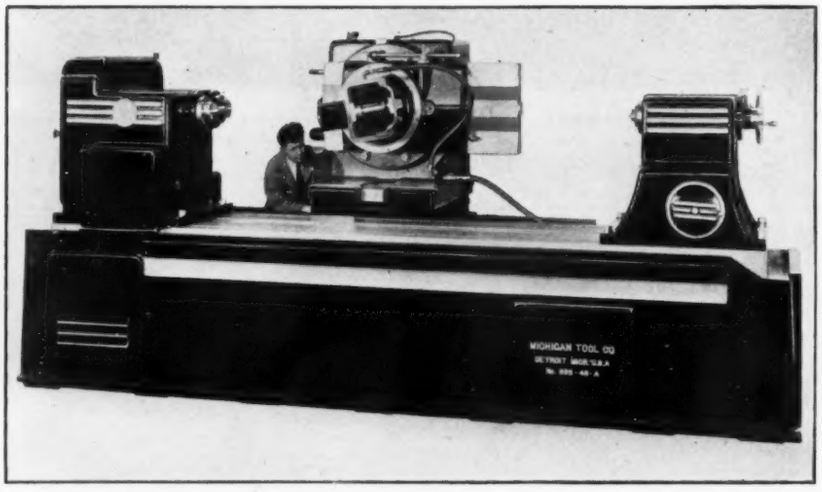


HOBBING MACHINE—*Gould & Eberhardt, Newark, N. J.* The No. 120H universal gear hobbing machine has a nominal capacity for gears of 120-in. diameter, 48-in. face width at 45 deg. and 2½ diametral pitch, but at low helix angles it will accommodate gears up to 160 in. in diameter. It weighs 138,000 lb. and requires a 20×30-ft. floor space. Two opposite cutter heads permit both right- and left-hand portions of double-helical gears to be cut simultaneously. Direct current motors are used so that, in the event of power failure during a finishing cut, standby storage batteries can keep the machine in continuous operation. Vol. 85, p. 357.

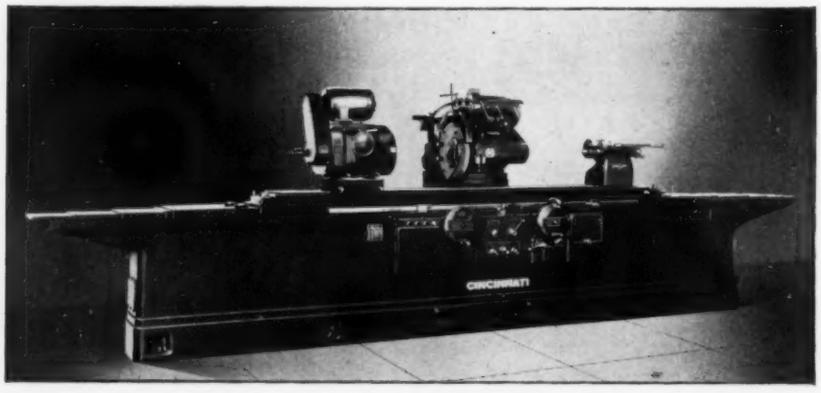
MACHINE TOOLS—Gear Finishers



GEAR SHAVING MACHINE—*National Broach Machine Co.*, 11457 *Shoemaker St., Detroit, Mich.* This Red Ring gear shaving machine finishes gears up to 36 in. in diameter, 2-in. pitch and with face widths up to 36 in. Cutting tool is driven by the work gear, eliminating high driving torque. An important feature is ability to develop the elliptoid tooth form. Vol. 85, p. 625.

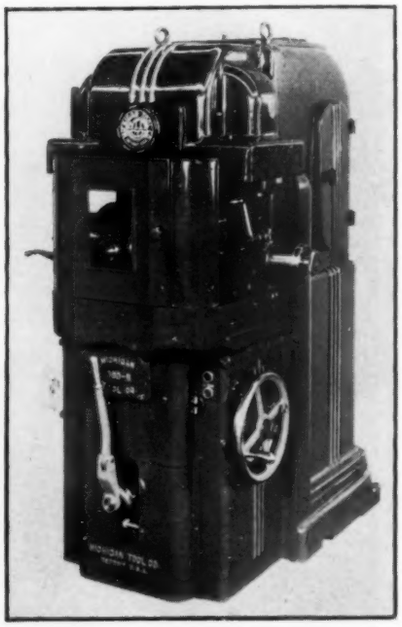


GEAR SHAVERS—*Michigan Tool Co.*, 7171 *E. McNichols Rd., Detroit, Mich.* Three sizes of gear finishing machines with capacities of 1 to 24 in., 2 to 36 in., and 4 to 48 in., employ crossed-axis principle of gear shaving. Variable speeds range from 7 to 44 r.p.m. for larger and from 40 to 375 r.p.m. for smaller machines. Vol. 85, p. 1343.



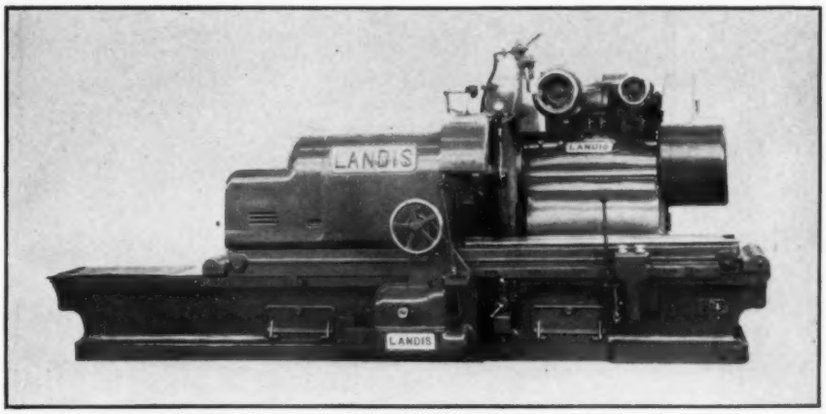
UNIVERSAL GRINDERS—*Cincinnati Grinders, Inc., Cincinnati, Ohio.* Embodying features similar to the 12-in. hydraulic universal grinder, grinders with 14, 16 and 18 in. swings and 36, 48 and 72 in. between-center lengths are available. Hydraulically powered table has variable traverse rates. Power table stroke can be set as short as $\frac{3}{4}$ in. Vol. 85, p. 891.

HOBBING MACHINE—*Hunter Engineering Co., Blaine and Pachappa Sts., Riverside, Calif.* Worm gears are finished from plain die cast zinc alloy blanks at a rate of 960 pieces per hour with this special hobbing machine. Vol. 85, p. 85.

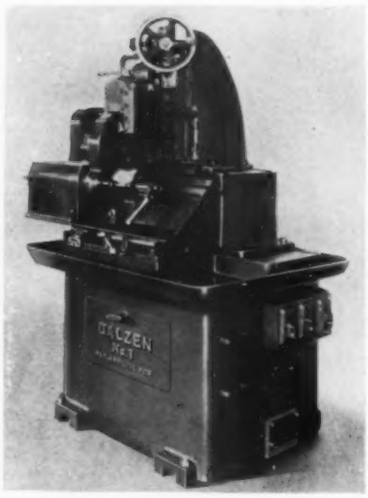


CROSSED-AXIS GEAR SHAVER—*Michigan Tool Co.*, 7171 *E. McNichols Rd., Detroit, Mich.* This Model 860-B-1 crossed-axis gear shaver finishes internal gears through a combination of work rotation, cutter reciprocation and vertical work feed. Vol. 85, p. 408.

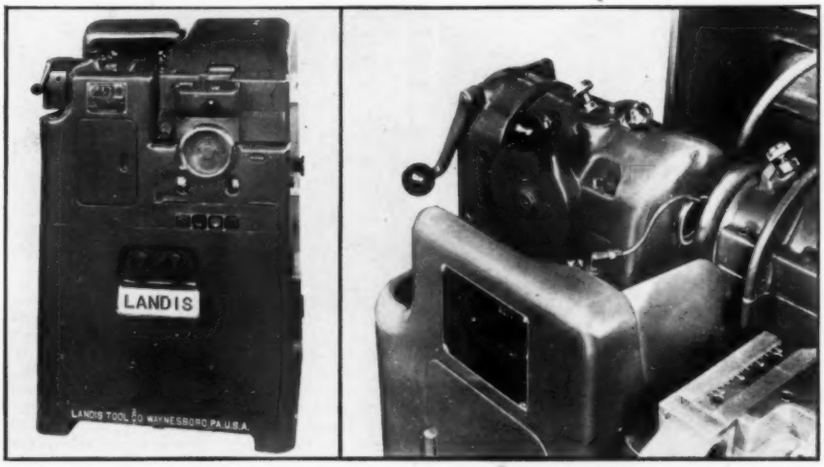
SURFACE GRINDER—*Continental Machines, Inc.*, 1301 *Washington Ave. S., Minneapolis, Minn.* The Model GP "Do-all" grinder for precision surfacing is built for either dry or wet grinding. Table capacity is 9 × 18 in. Vol. 85, p. 196.



RADIAL CRANK GRINDER—*Landis Tool Co., Waynesboro, Pa.* Although designed especially for radial crankshaft work, the new 25-in. Type D grinder is suitable for a wide variety of operations when equipped with the proper tooling. The 25 in. swing gives the machine sufficient capacity to handle the largest of radial cranks. A work speed of 30 or 55 r.p.m. is available on the standard machine. A 42-in. diameter wheel is used. Vol. 85, p. 829.



THREAD GRINDERS—*Dalzen Tool & Mfg. Co., 511 Leib St., and Snyder Tool & Engineering Co., 3400 E. Lafayette St., Detroit, Mich.* The No. 1 Dalzen thread grinder handles work 3 in. in diameter, 8 in. between centers with a 4-in. thread length anywhere within the maximum work length. Work table pivots 15 deg. either side of center for helix angles. The No. 2 machine handles work 6 in. in diameter, 18 in. between centers; with a 10-in. thread length anywhere between centers. Wheelhead and column pivot 25 deg. either side of center. Vol. 85, p. 196.



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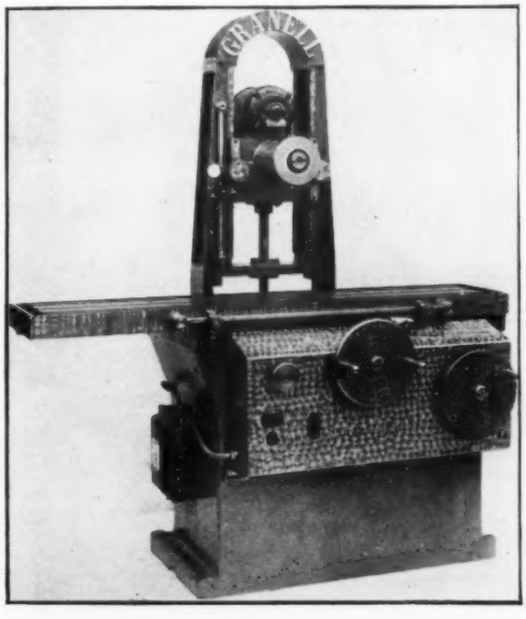
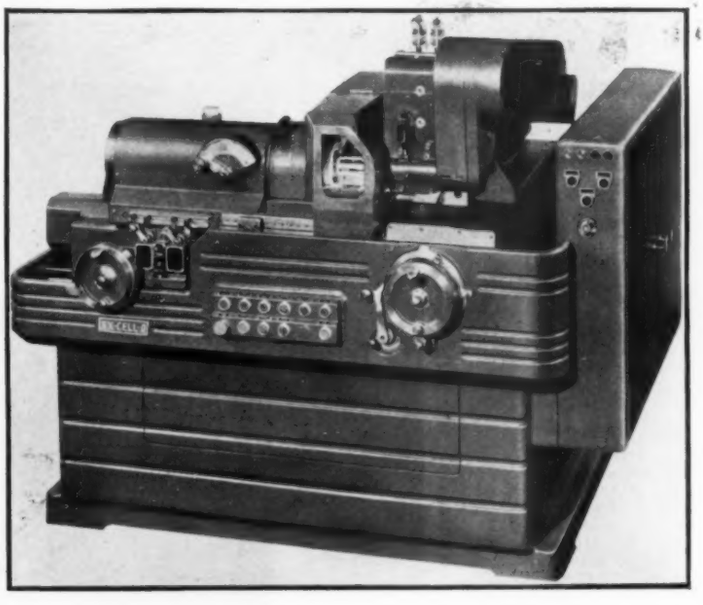
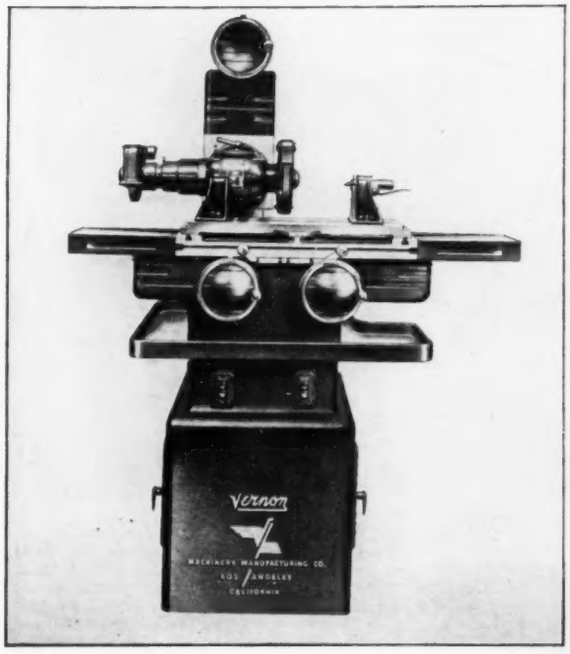
RACE-A-WAY GRINDER—*Landis Tool Co., Waynesboro, Pa.* The improved No. 1 "Race-A-Way" grinder intended for producing smaller size ball bearing races up to and including the No. 204, is equipped with a "Landis-Solex" sizing device which in combination with an electric timing device permits the performance of three operations during the same automatic grinding cycle. Wheel spindle operates at 50,000 r.p.m. Vol. 85, p. 460.

SURFACE GRINDER—*G. P. Granell & Son, 292 Geary Ave., Toronto, Canada.* Cylindrical and surface grinding can be performed with this automatic feed grinder. Table is 68 in. long by 12 in. wide, has a hand travel of 36 in., automatic travel of 34 in., cross-feed of 10 in. and has a worm-rack drive. Vol. 85, p. 1172.

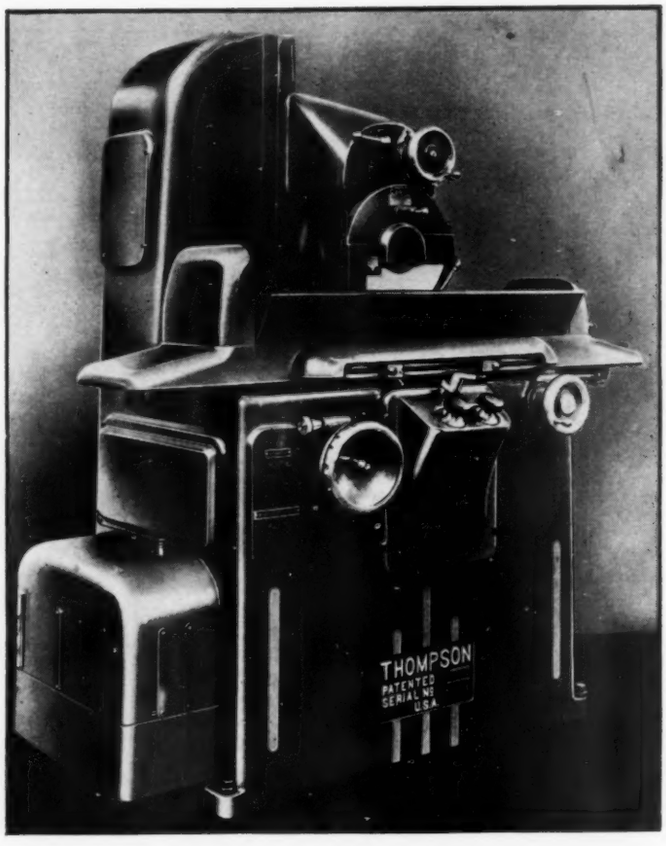
INTERNAL THREAD GRINDER—*Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit, Mich.* For grinding threads to 5 in. in length within 15½ in. of work spindle nose, the Style 39A internal thread grinder has 10 in. swing. Maximum hole that can be ground is 9½ in., while minimum is 1 in. Vol. 85, p. 1070.



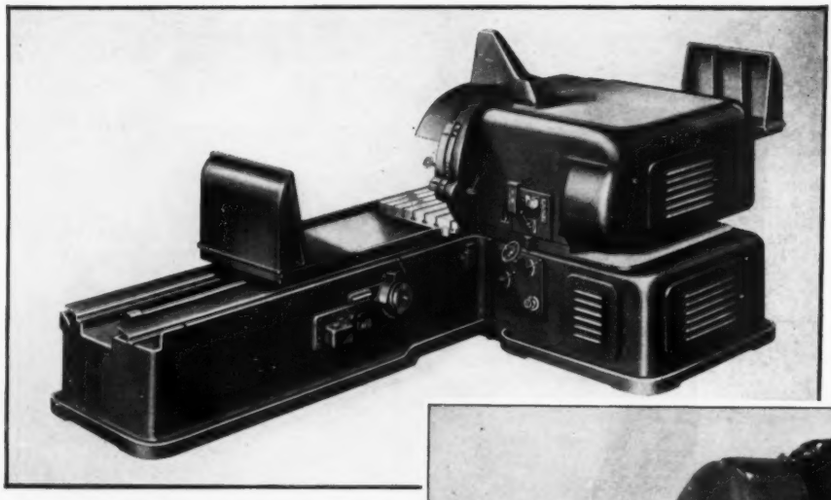




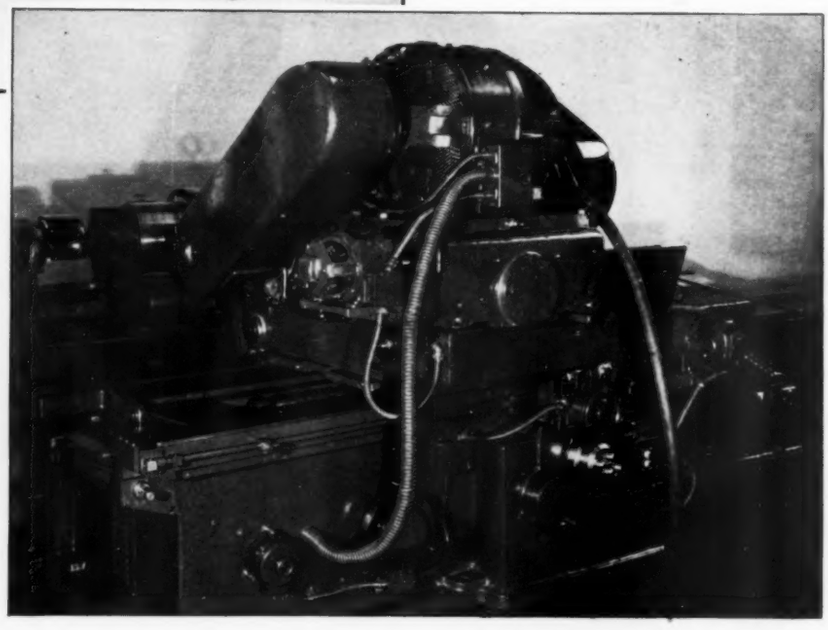
GRINDER—*Machinery Mfg. Co., Dept. AM-441, 1915 E. 51st St., Vernon, Los Angeles, Calif.* This universal combination grinder for all types of tool, cutter and reamer grinding, as well as external and internal cylindrical and surface grinding takes a 6×10 in. magnetic chuck, and will grind a complete area of 6×16×7½ in. above the table. Swing is 8 in. It will accommodate 16 in. between centers, with a hand longitudinal feed of 16 in., 8-in. vertical travel of motor, and 6-in. in-out travel of column. Vol. 85, p. 566.



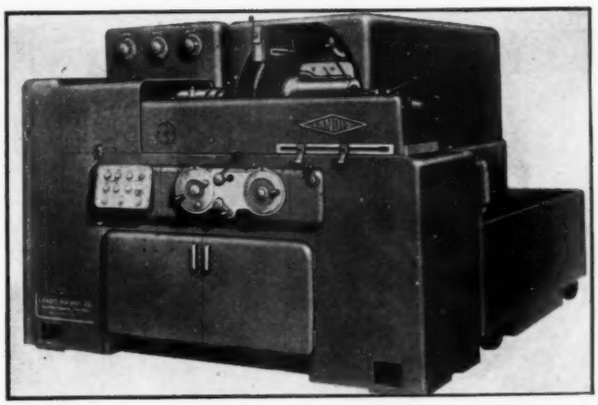
SURFACE GRINDER — *Thompson Grinder Co., Springfield, Ohio.* The Type F small, sensitive, high-speed toolroom and production surface grinder is a sliding head model with horizontal spindle, grinding with the periphery of the wheel with reciprocating table. Both hydraulic and hand feeds to the table and wheel head are provided. Work table measures 6×18 in. and hydraulic table movement is 5 to 50 ft. per min. Vol. 85, p. 1115.



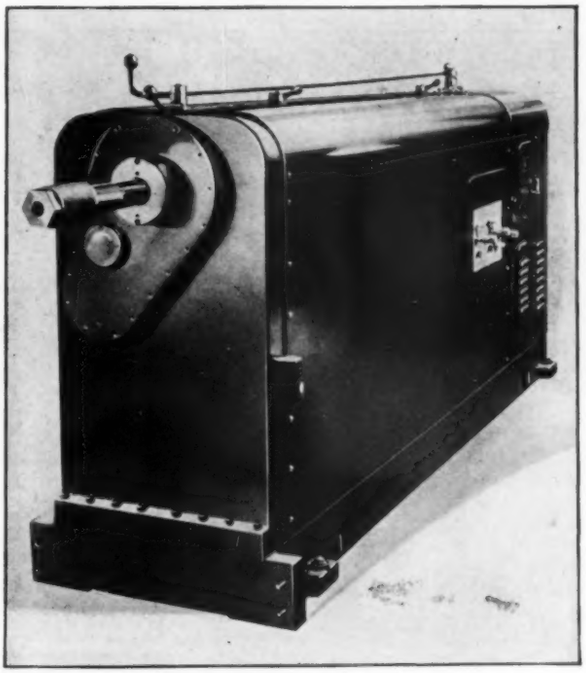
FACE GRINDER — *Diamond Machine Co., Philadelphia, Pa.* Available in 30 and 36 in. sizes, corresponding to the diameter of the grinding wheel, the "Philadelphia Type" face grinder increases speed of production. One of its features is centralization of all controls. Bed has been lengthened so table never overhangs. Vol. 85, p. 625.



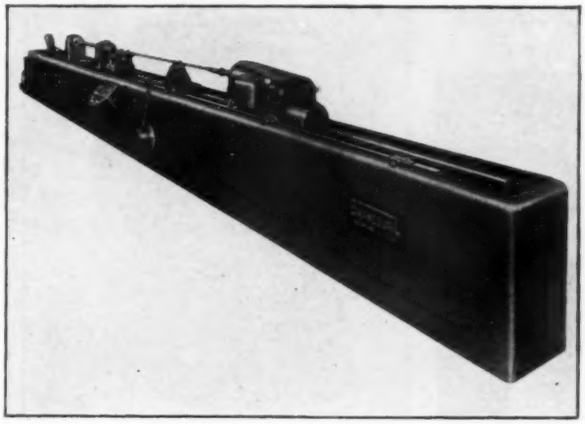
ROLL GRINDER—*Farrel-Birmingham Co., Ansonia, Conn.* Built into the Type TT roll grinder at the time of manufacture, a tapering attachment incorporates design features which enable the accurate grinding of tapers in minimum time in either direction. Design eliminates backlash and deflection in machine parts. Vol. 85, p. 263.



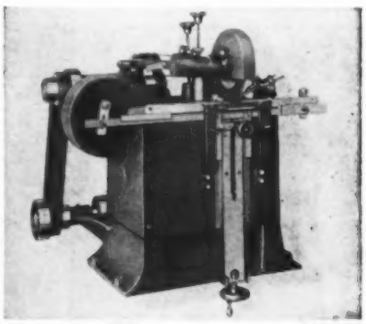
THREAD GRINDER — *Landis Machine Co., Waynesboro, Pa.* Set up changes on the No. 6 precision thread grinder can be made with ease and speed. The machine is suitable for both right and left hand grinding of 2 to 80 external threads per inch. Maximum diameter is 6 in.; thread length on work, 12 in.; and center distance, 24 in. Maximum helix angle on worm threads is 15 deg. Vol. 85, p. 1067.



HONING MACHINE—*Enterprise Machine Parts Corp., Detroit, Mich.* Parts from 2 to 12 in. in diameter requiring a stroke up to 57 in. in length can be honed on the "Empco" horizontal honing machine. Spindle speeds range from 50 to 200 r.p.m., in seven increments. Vol. 85, p. 133.

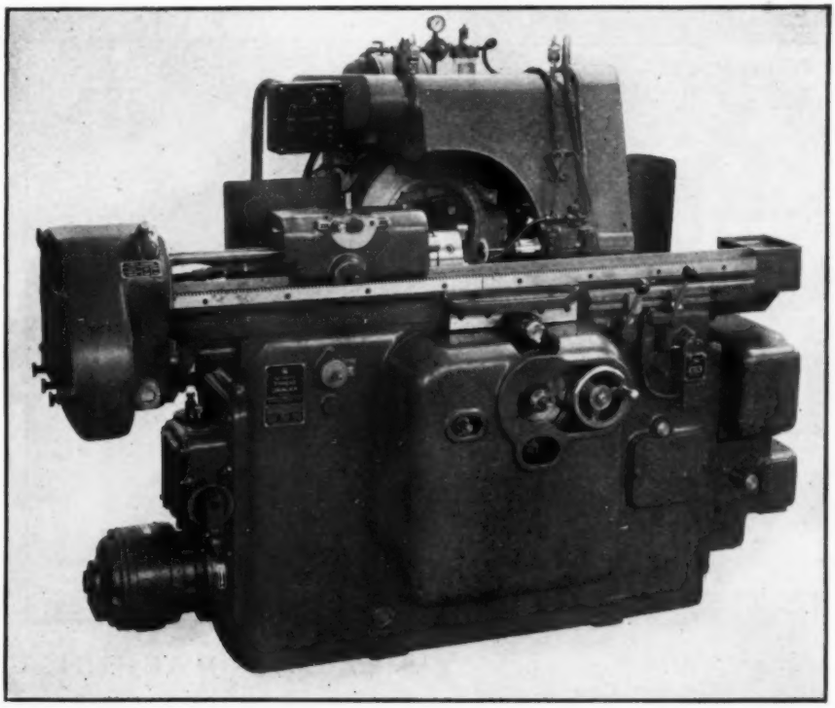


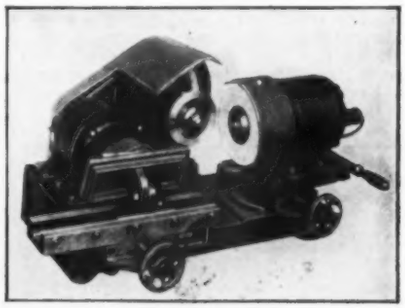
HORIZONTAL HYDRAULIC HONER — *Barnes Drill Co., 830 Chestnut St., Rockford, Ill.* Smooth true finish can be produced on the internal cylindrical walls of rifle bores, tubes, cylinders and other long work with the No. 1 horizontal hydraulic honer for bores to 1½ in. diameter. Standard working stroke is 8 ft. Vol. 85, p. 942.



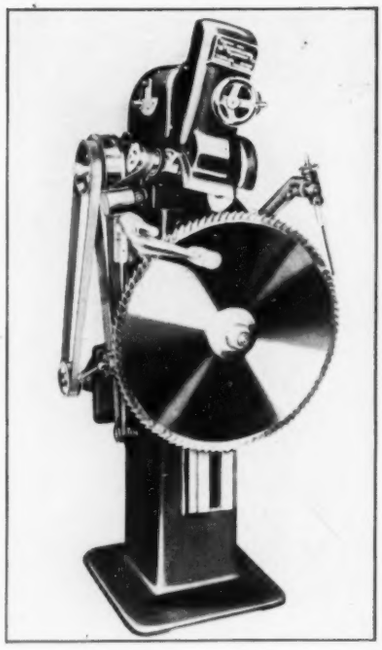
SAW GRINDER—*Wardwell Mfg. Co., 3167 Fulton Road, Cleveland, Ohio.* This Model E-C combination automatic saw grinder will sharpen circular, hack and band saws in a wide range of sizes. Vol. 85, p. 196.

INTERNAL THREAD GRINDERS—*Jones & Lamson Machine Co., Springfield, Vt.* Fully automatic operation is a feature of the line of internal thread grinding machines. Model TG-63 swings 7½ in., grinds threads to 6 in. in diameter and 3 in. maximum length in work up to 10 in. over-all length. Model TG-624 swings 7½ in., grinds threads to 6½ in. in diameter and 5 in. maximum length in work up to 24 in. length over-all. Model TG-1230 swings 21 in., grinds threads to 14 in. in diameter and 5 in. maximum length in work up to 24 in. maximum length. Vol. 85, p. 507.

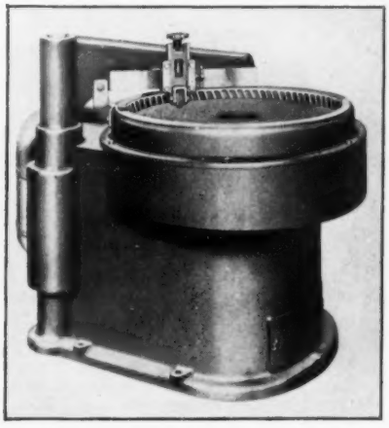




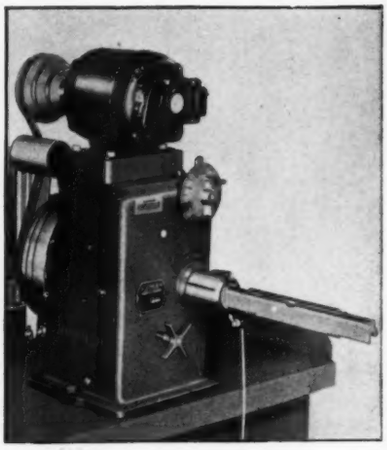
SLITTER GRINDER—*Samuel C. Rogers & Co., 191 Dutton Ave., Buffalo, N. Y.* Type CC midget slitter grinder is for circular slitters up to 6 in. in diameter and straight corner cutters up to 8 in. long. When fitted with proper attachment, this unit will sharpen drills up to ½ in. diameter. Vol. 85, p. 31.



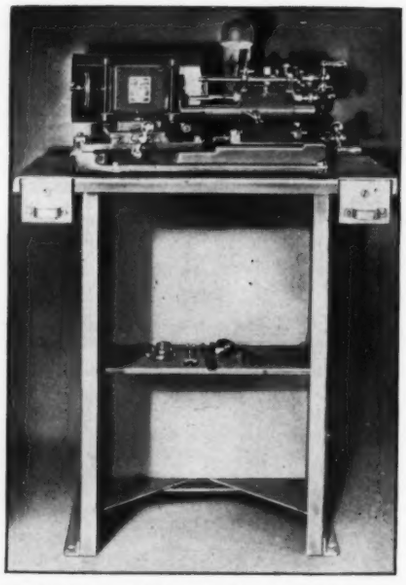
SAW GRINDER — *Motch & Merryweather Machinery Co., Cleveland, Ohio.* Alternate high and low teeth can be ground in one setting by positioning a lever on the left-hand side of the No. 1 automatic saw grinder for the segmental saw blades used in conjunction with Nos. 3 and 4 hydraulic cold sawing machines. Vol. 85, p. 460.



HORIZONTAL DISK GRINDER — *Gardner Machine Co., 410 E. Gardner St., Beloit, Wis.* No. 186 horizontal disk grinder has been developed for grinding flat surfaces of castings which do not need to have accurately ground surfaces relative to other surfaces. Vol. 85, p. 364.



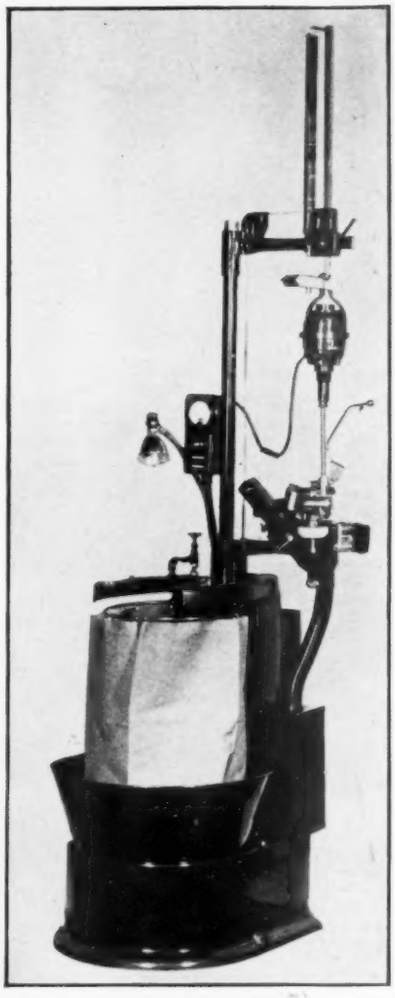
HONING MACHINE—*Sunnen Products Co., 7941 Manchester Ave., St. Louis, Mo.* Suitable for production, maintenance, salvage and tool and die work, the Model MA precision honing machine will finish any hole from 0.185 to 2.400 in. in diameter and up to 7 in. long with an accuracy of 0.0001 in. Vol. 85, p. 264.



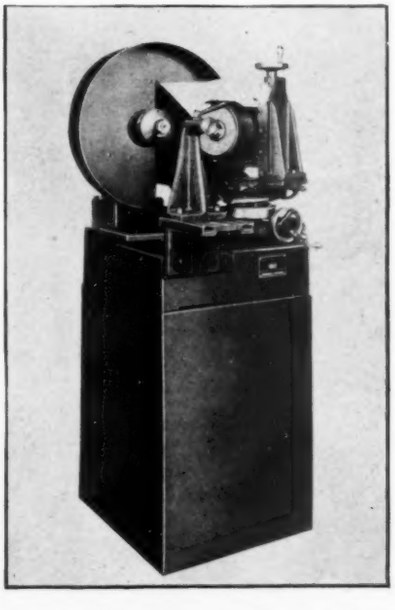
TAP GRINDERS—*Edward Blake Co., 634 Commonwealth Ave., Newton Centre, Mass.*. New No. 1 and No. 2 J-B tap grinders, designed for sharpening taps on the chamfer, will sharpen 2, 3, 4 and 5-flute taps and can be equipped for grinding 6, 8 and 10-flute taps. A new J-B tap grinder kneeroom pedestal is furnished as an optional extra. Vol. 85, p. 831.

ROTARY KNIFE GRINDER—*Samuel C. Rogers & Co., 191 Dutton Ave., Buffalo, N. Y.* Of rugged construction for long life, the No. CC-33 grinder has an adjustable grinding head for circular knives from 2 to 20 in. in diameter. Vol. 85, p. 454.

KNIFE GRINDER—*Samuel C. Rogers & Co., 191 Dutton Ave., Buffalo, N. Y.* Available in four standard sizes for 70, 90, 108 and 132 in. knives, the Type NT grinder is capable of heavy cuts. Table is driven at 28 ft. per min. A 14- or 16-in. diameter segmental wheel is used. Machine also is built with special platen for sizing light armor plate 1 in. thick, 36 in. wide and 100 in. long. Vol. 85, p. 188.



VALVE SEAT GRINDER—*Hall Mfg. Co., Toledo, Ohio.* With this wet type valve seat grinder bronze, stainless steel, stellite and other alloy seats can be ground to a precision finish in an average of 5 min. per seat. Reaming or fly-cutting is eliminated. Grinding wheel speed is 10,500 r.p.m. as it travels eccentrically around the pilot. Vol. 85, p. 1174.



American Standard Jig Bushings—I

THIS REVISED STANDARD for jig bushings was sponsored by the National Machine Tool Builders' Association, the Society of Automotive Engineers, and The American Society of Mechanical Engineers, and was approved by the American Standards Association in August, 1941.

Nomenclature

Press Fit Bushings. Press fit wearing bushings to guide the tool are for installation directly in the jig without the use of a liner and are employed principally where the bushings are used for short production runs and will not require replacement. They are intended also for use where the closeness of the center distance of holes will not permit the installation of liners and renewable bushings. Press fit bushings are made in two types, with heads and without.

Renewable Bushings. Renewable wearing bushings to guide the tool are for use in liners which in turn are installed in the jig. They are used where the bushing will wear out or become obsolete before the jig, or where several bushings are to be interchangeable in one hole. Renewable wearing bush ings are divided into two classes. "Fixed" and "Slip."

Fixed renewable bushings are installed in the liner with the intention of leaving them in place until worn out.

Slip renewable bushings are interchangeable in a given size of liner and, to facilitate removal, they are usually made with a knurled head. They are most frequently used where two or more operations requiring different inside diameters are performed in a single jig, such as where drilling is followed by reaming, tapping, spot-facing, counter-boring, or some other secondary operation.

Liner Bushings. Liner bushings are provided with and without heads and are permanently installed in a jig to receive the renewable wearing bushings. They are sometimes called "master bushings."

Bushing Specifications. The dimensions and tolerances of jig bushings shall conform to the specifications given in the following tables and notes.

Jig Plate Thickness. The standard lengths of the press fit portion of jig bushings as established are based on standardized or uniform jig plate thicknesses of $\frac{5}{16}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{3}{8}$, and $1\frac{3}{4}$ inches.

Table 1 Press Fit Wearing Bushings—Headless and Head Types

Range of Hole Size[1,2] A		Body Diameter B					Body Length[4] C			Width of Chamfer[5] D	Head Diameter[6] F	Head Height G
		Unfinished[3]			Finished							
From	Up to and Including	Nominal	Max	Min	Max	Min	Short	Medium	Long		Max	Max
0.0156	0.0625	5/32	0.166	0.161	0.1578	0.1575	5/16	.	1/2	1/32	1/4	3/32
0.0630	0.0995	13/64	0.213	0.208	0.2046	0.2043	5/16	..	1/2	1/32	5/16	3/32
0.1024	0.1378	1/4	0.260	0.255	0.2516	0.2513	5/16	...	1/2	1/32	3/8	3/32
0.1406	0.1875	5/16	0.327	0.322	0.3141	0.3138	5/16	1/2	3/4	1/32	7/16	1/8
0.1910	0.2500	13/32	0.421	0.416	0.4078	0.4075	5/16	1/2	3/4	1/16	17/32	5/32
0.2520	0.3125	1/2	0.520	0.515	0.5017	0.5014	5/16	1/2	3/4	5/64	5/8	7/32
0.3160	0.4219	5/8	0.645	0.640	0.6267	0.6264	1/2	3/4	1	3/32	13/16	7/32
0.4375	0.5000	3/4	0.770	0.765	0.7518	0.7515	1/2	3/4	1	7/64	15/16	7/32
0.5156	0.6250	7/8	0.895	0.890	0.8768	0.8765	3/4	1	1 3/8	7/64	1 1/8	1/4
0.6406	0.7500	1	1.020	1.015	1.0018	1.0015	3/4	1	1 3/8	7/64	1 1/4	5/16
0.7656	1.0000	1 3/8	1.395	1.390	1.3772	1.3768	3/4	1	1 3/8	9/64	1 5/8	3/8
1.0156	1.3750	1 3/4	1.770	1.765	1.7523	1.7519	1	1 3/8	1 3/4	9/64	2	3/8
1.3906	1.7500	2 1/4	2.270	2.265	2.2525	2.2521	1	1 3/8	1 3/4	7/32	2 1/2	3/8

All dimensions given in inches.

Tolerance on fractional dimensions where not otherwise specified shall be ±0.010 inch.

[1] Hole sizes are in accordance with the American Standard for Twist Drill Sizes (ASA B5.12–1940).

[2] The maximum and minimum values of the hole size, A, shall be as follows:

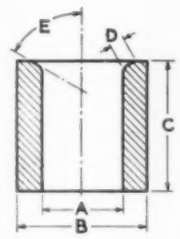
Nominal Size of Hole	Maximum	Minimum
Above 0.0000 to 1/4 in. incl.	Nominal +0.0004 in.	Nominal +0.0001 in.
Above 1/4 to 3/4 in. incl.	Nominal +0.0005 in.	Nominal +0.0001 in.
Above 3/4 to 1 1/2 in. incl.	Nominal +0.0006 in.	Nominal +0.0002 in.
Above 1 1/2	Nominal +0.0007 in.	Nominal +0.0003 in.

[3] The body diameter, B, for unfinished bushings is larger than the nominal diameter in order to provide grinding stock for fitting to jig plate holes. The grinding allowance is 0.005 to 0.010 in. for sizes 5/32, 13/64, and 1/4 in.,
0.010 to 0.015 in. for sizes 5/16 and 13/32 in., and
0.015 to 0.020 in. for sizes 1/2 in. and up.

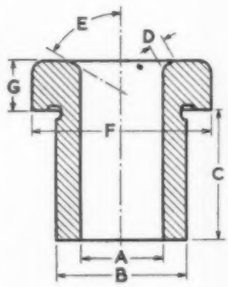
[4] The length, C, is the overall length for the headless type and the length underhead for the head type.

[5] The angle of chamfer, E, shall be 59 deg ± 1 deg and a slight radius shall be provided at the intersection of this chamfer with the hole, A.

[6] The head design shall be in accordance with the manufacturer's practice.



PRESS FIT, HEADLESS WEARING BUSHING



PRESS FIT, HEAD TYPE WEARING BUSHING

STARRETT TOOLS

Contributing to AMERICA'S AIR SUPERIORITY

(Above) This scene in a die department of Northrop Aircraft, Inc., is typical of countless STARRETT TOOL applications. The workman is using Starrett Dividers, Combination Square and Surface Gage to check the dimensions and contour of a plaster die-casting pattern.

(Left) A precision inspection operation at Ranger Aircraft Engines. The inspector is using a 24-inch Starrett Vernier Height Gage No. 454 on the cylinder barrel of an aircraft engine.

Starrett Precision Tools are playing an important part in the modern production methods of America's Aircraft Industry. By bringing sure accuracy, dependability and efficiency to the countless precision measuring and inspecting operations required, they are helping to make American planes the finest in the world. Starrett Catalog No. 26-C illustrates a complete line of fine precision tools, dial indicators, steel tapes, rules and other tools that are standard equipment in aircraft plants. Write for a copy.

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American Standard Jig Bushings—II

Table 2 Renewable Wearing Bushings—Slip and Fixed Head Types

Range of Hole Size[1,2] A		Body Diameter B			Width of Chamfer[3] D	Head Diameter[4] F
From	Up to and Including	Nominal	Max	Min		Max
0.0000	0.1562	5/16	0.3125	0.3123	1/32	5/8
0.1610	0.3125	1/2	0.5000	0.4998	5/64	15/16
0.3160	0.5000	3/4	0.7500	0.7498	7/64	1 1/4
0.5156	0.7500	1	1.0000	0.9998	7/64	1 5/8
0.7656	1.0000	1 3/8	1.3750	1.3747	9/64	2
1.0156	1.3750	1 3/4	1.7500	1.7497	9/64	2 1/2
1.3906	1.7500	2 1/4	2.2500	2.2496	7/32	3

All dimensions given in inches.

Tolerance on fractional dimensions where not otherwise specified shall be ±0.010. inch.

[1] Hole sizes are in accordance with the American Standard for Twist Drill Sizes (ASA B5.12–1940).

[2] The maximum and minimum values of hole size, A, shall be as follows:

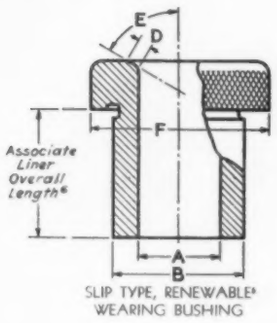
Nominal Size of Hole	Maximum	Minimum
Above 0.0000 to 1/4 in. incl.	Nominal +0.0004 in.	Nominal +0.0001 in.
Above 1/4 to 3/4 in. incl.	Nominal +0.0005 in.	Nominal +0.0001 in.
Above 3/4 to 1 1/2 in. incl.	Nominal +0.0006 in.	Nominal +0.0002 in.
Above 1 1/2	Nominal +0.0007 in.	Nominal +0.0003 in.

[3] The angle of chamfer, E, shall be 59 deg ± 1 deg and a slight radius shall be provided at the intersection of this chamfer with the hole, A.

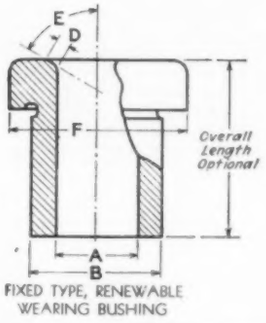
[4] The head design shall be in accordance with the manufacturer's practice.

[5] Head of slip type is usually knurled.

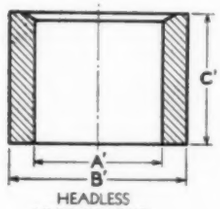
[6] When renewable wearing bushings are used with liner bushings of the head type, the length under head should be increased over the jig plate thickness by the thickness of the liner bushing head.



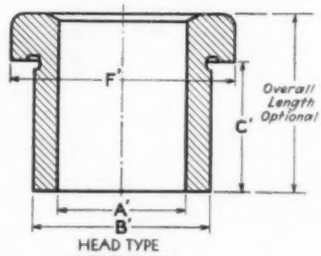
SLIP TYPE, RENEWABLE[5] WEARING BUSHING



FIXED TYPE, RENEWABLE WEARING BUSHING



HEADLESS LINER BUSHING



HEAD TYPE LINER BUSHING

Table 3 Liner Bushings—Headless and Head Type

Range of Hole Size in Renewable Wearing Bushings[1]		Inside Diameter A'			Body Diameter B'					Jig Plate Thickness[2] C'			Head Diameter[4] F'
					Unfinished[3]			Finished					
From	Up to and Including	Nominal	Max	Min	Nominal	Max	Min	Max	Min	Short	Medium	Long	Max
0.0000	0.1562	5/16	0.3129	0.3126	1/2	0.520	0.515	0.5017	0.5014	5/16	1/2	3/4	5/8
0.1610	0.3125	1/2	0.5005	0.5002	3/4	0.770	0.765	0.7518	0.7515	5/16	1/2	3/4	15/16
0.3160	0.5000	3/4	0.7506	0.7503	1	1.020	1.015	1.0018	1.0015	1/2	3/4	1	1 1/4
0.5156	0.7500	1	1.0007	1.0004	1 3/8	1.395	1.390	1.3772	1.3768	3/4	1	1 3/8	1 5/8
0.7656	1.0000	1 3/8	1.3760	1.3756	1 3/4	1.770	1.765	1.7523	1.7519	3/4	1	1 3/8	2
1.0156	1.3750	1 3/4	1.7512	1.7508	2 1/4	2.270	2.265	2.2525	2.2521	1	1 3/8	1 3/4	2 1/2
1.3906	1.7500	2 1/4	2.2515	2.2510	2 3/4	2.770	2.765	2.7526	2.7522	1	1 3/8	1 3/4	3

All dimensions given in inches.

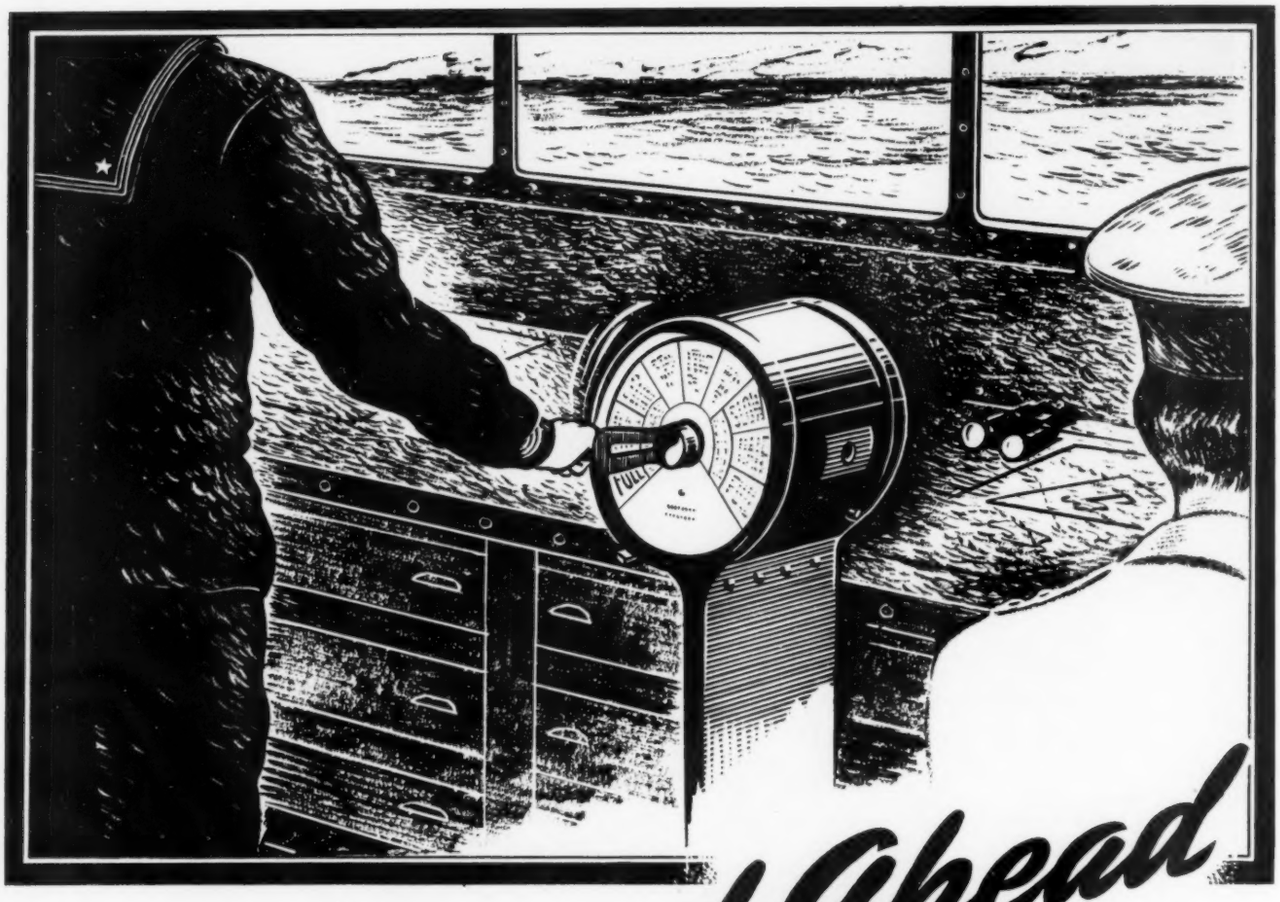
Tolerance on fractional dimensions where not otherwise specified shall be ±0.010 inch.

[1] For detail dimensions of renewable wearing bushings see Table 2.

[2] The body diameter, B', for unfinished bushings is 0.015 to 0.020 in. larger than the nominal diameter in order to provide grinding stock for fitting to jig plate holes.

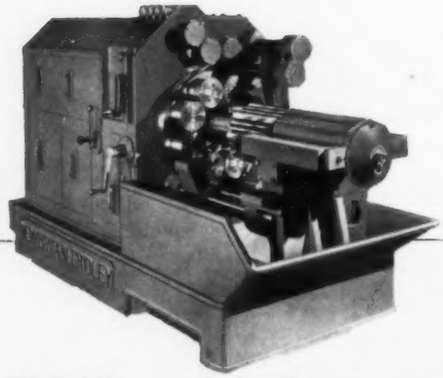
[3] The length, C', is the overall length for the headless type and the length under head for the head type.

[4] The head design shall be in accordance with the manufacturer's practice.



Full Speed Ahead

On the industrial battle line, too, all obstacles must be swept aside as we speed ahead in our program to supply our armed forces with the weapons of war. Working around the clock, we steadily step up production of New Britain Automatics — so that other manufacturers can steadily step up production of vital supplies.



Model 86, one of New Britain's complete line of Chuckers: four, six and eight spindles to 10¼" capacity. New Britain also builds a complete line of Multiple Spindle Screw Machines up to 2¼" Capacity.

ON WITH THE JOB

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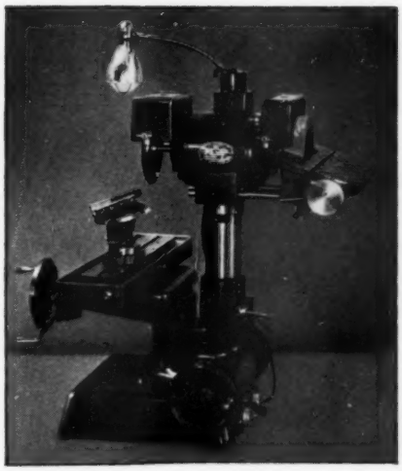
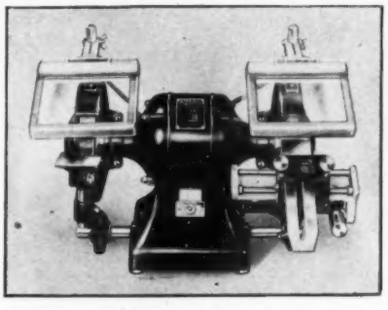
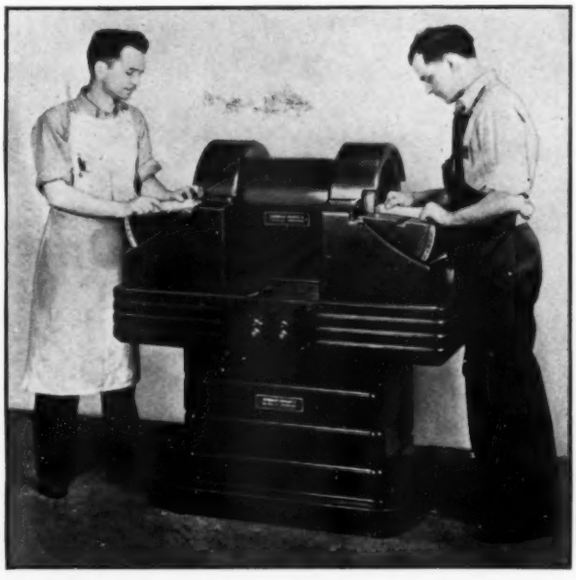


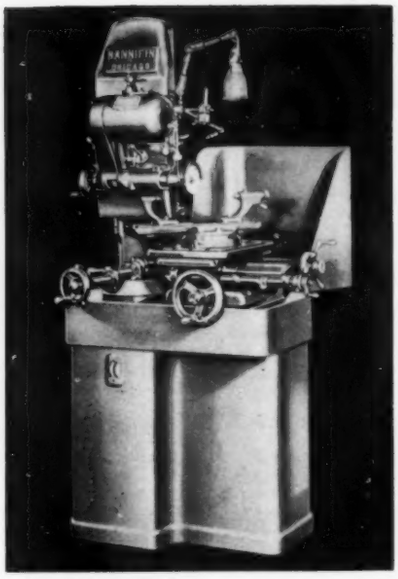
CHIP BREAKER GRINDER—*K. O. Lee Co., Aberdeen, S. D.* Quick and accurate maintenance of cemented carbide and tungsten carbide tools is provided by the Model A603 chip breaker grinder and its companion Model A645 tilting table. The grinding of chip breaker groove is accomplished with a full universal vise, adjustable to all angles. Vol. 85, p. 1238.



TOOL GRINDER—*K. O. Lee Co., Aberdeen, S. D.* This Model A600 tool and cutter grinder takes 16 in. between centers and swings 6¼ in. over table. Longitudinal table movement, 11 in.; cross-feed, 3½ in.; vertical feed, 7 in. Vol. 85, p. 626.

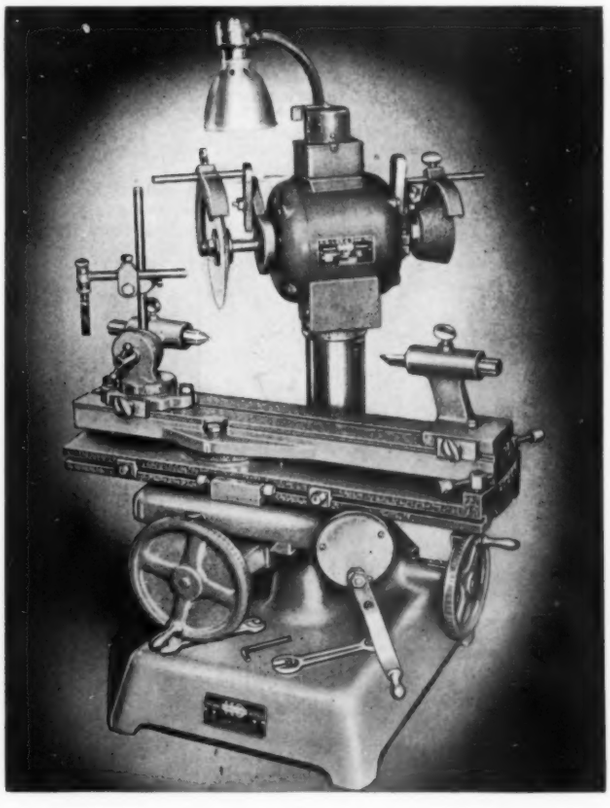
CARBIDE TOOL GRINDER — *Carboloy Co., 11149 E. Eight Mile Rd., Detroit, Mich.* The high capacity of this 14-in. carbide tool grinder of the double end type, designed so that two operators can grind tools simultaneously, makes it suitable for plants where a large number of carbide tools are being used or ground daily. Vol. 85, p. 454.

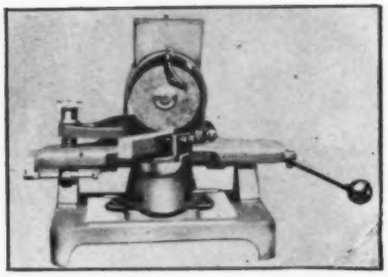




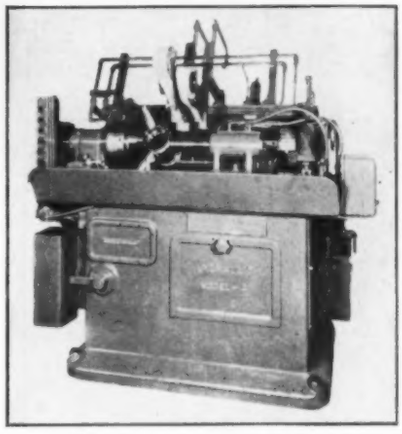
TOOL GRINDER—*Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago, Ill.* Functions of both a grinding machine and a precision measuring instrument are combined in the No. 5 universal precision tool grinder built to produce accurate tools of many kinds. Pulleys provide ten spindle speeds from 3,600 to 35,000 r.p.m. Table working surface is 9×13 in. Wheels from ⅛ to 4 in. in diameter can be used. Vol. 85, p. 131.

TOOL GRINDER—*Stanley Electric Tool Div., Stanley Works, New Britain, Conn.* Especially suited for use in industrial shops for keeping edge tools sharp, the No. 677 grinder is available for a.c. or d.c., has a maximum speed of 1,800 r.p.m., is equipped with two 7×1 in. wheels and furnished with "Flud-Lite" eye shields. Vol. 85, p. 564.

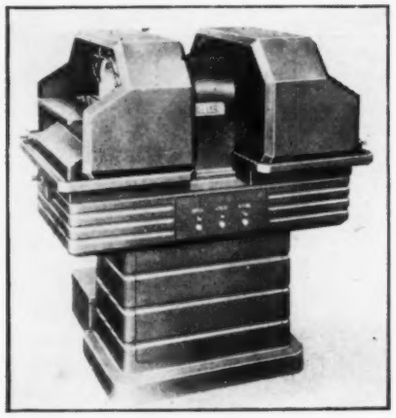




CHIP BREAKER GRINDER—*Drafto Co., 112 Walnut St., Cochranton, Pa.* Model A grinder, for grinding chip breaker grooves in carbide metal cutting tools, has been designed to simplify correct tool adjustment to any angle. Vol. 85, p. 561.

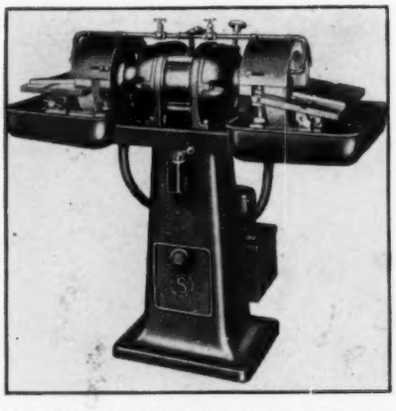


LAPPER—*A. P. Schraner & Co., Paine Ave. and E. 33rd St., Cleveland, Ohio.* The Model A machine has been fitted with special adapter and loading device for finishing propeller hub spiders. Vol. 85, p. 1292.



CARBIDE TOOL GRINDER — *Ex-Cell-O Corp.*, 1200 *Oakman Blvd., Detroit, Mich.* This double end 14-in. carbide tool grinder can be equipped for either dry or wet grinding. Vol. 85, p. 1068.

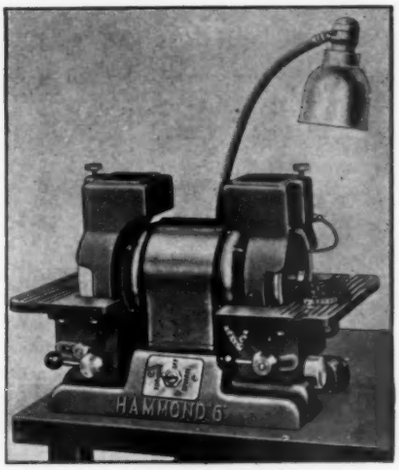
TOOL GRINDER—*T.C.M. Mfg. Co., Harrison, N. J.* Nearly all common types and forms of carbide tools can be sharpened with the "All-in-One" grinding and lapping equipment available in five types of head assemblies with alternative wheel and lap equipment. Included in this equipment are a groove grinding device, a micrometric feed protractor, a tip cutting attachment and a drill grinding attachment. Vol. 85, p. 186.



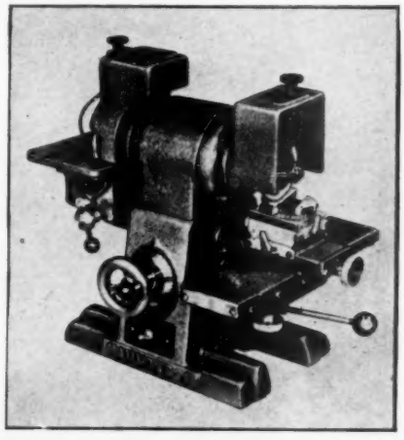
TOOL BIT GRINDER—*Standard Electrical Tool Co., Eighth St., Cincinnati, Ohio.* This high-speed tool bit grinder for wet and dry grinding is manufactured in three sizes; with 10-in. cup or steel back cylindrical wheels, with 12-in. and 14-in. wheels. Vol. 85, p. 1118.

TOOL GRINDER—*Delta Mfg. Co., 600–634 E. Vienna Ave., Milwaukee, Wis.* A carbide tool grinder which requires an inexpensive precision machine has been developed especially for the small tool room. It is available either as a bench or pedestal model, with several types of single and three-phase motors. Speed of 3,450 r.p.m. gives a surface speed of both wheels of 5,200 ft. per min. Vol. 85, p. 198.

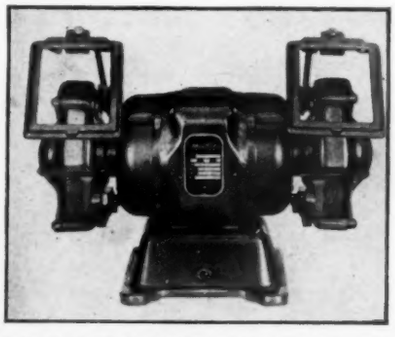
CARBIDE TOOL GRINDER — *Hammond Machinery Builders, Inc.*, 1618 *Douglas Ave., Kalamazoo, Mich.* Work tables tilt from 0 deg. (at level) to 25 deg. on this 10-in carbide tool grinder which combines facilities for straight wheel peripheral and cup wheel face grindings. Power to turn spindle at the standard rate of 2,100 r.p.m. is supplied through V-belts. Vol. 85, p. 1117.



CARBIDE TOOL GRINDER — *Hammond Machinery Builders, Inc.*, 1618 *Douglas Ave., Kalamazoo, Mich.* This carbide tool grinder using 6-in. silicon carbide or diamond wheels has extra-heavy easily removable tilting tables. Motor is reversible for right- or left-hand grinding. Vol. 85, p. 509.

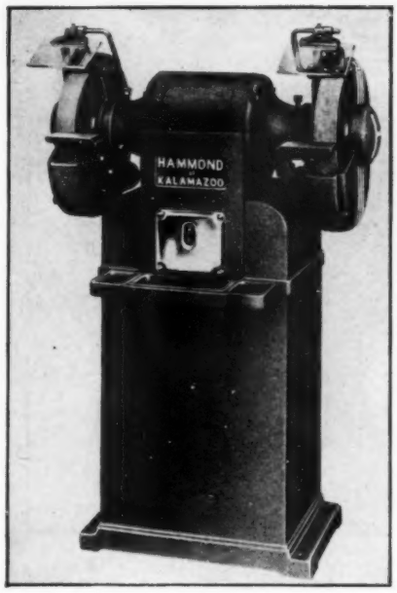


CHIP-BREAKER GRINDER — *Hammond Machinery Builders, Inc.*, 1618 *Douglas Ave., Kalamazoo, Mich.* Three separate planes of adjustment for setting the grinding angle when grinding chip-breaker grooves in carbide tools is provided by the new Model 4 machine which is furnished either as a bench or floor model. Vol. 85, p. 671.

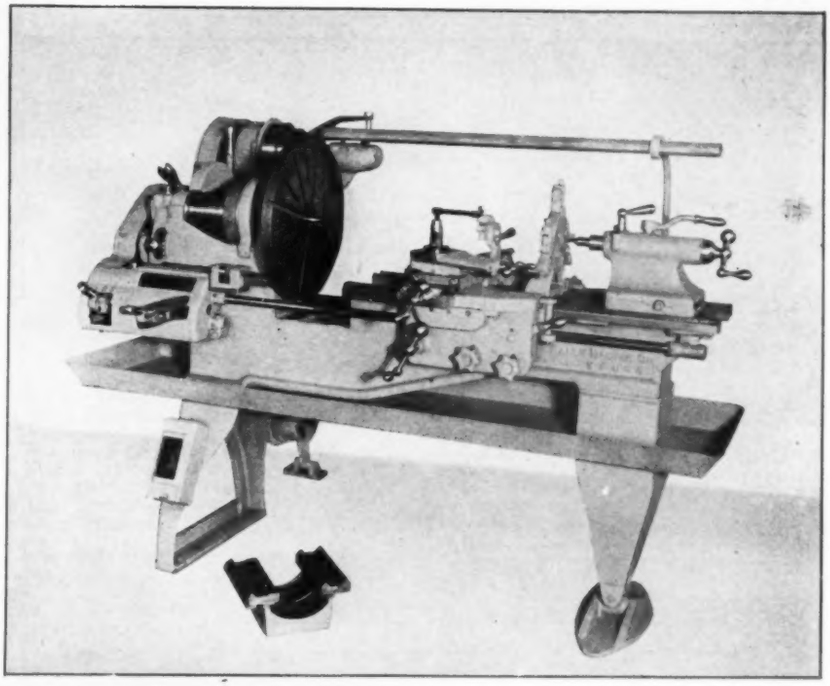


BENCH GRINDER—*Baldor Electric Co., St. Louis, Mo.* The No. 612 grinder to accommodate 6-in. diameter, ¾-in. wide grinding wheels is powered with a 1/3-hp. capacitor motor. Vol. 85, p. 412.

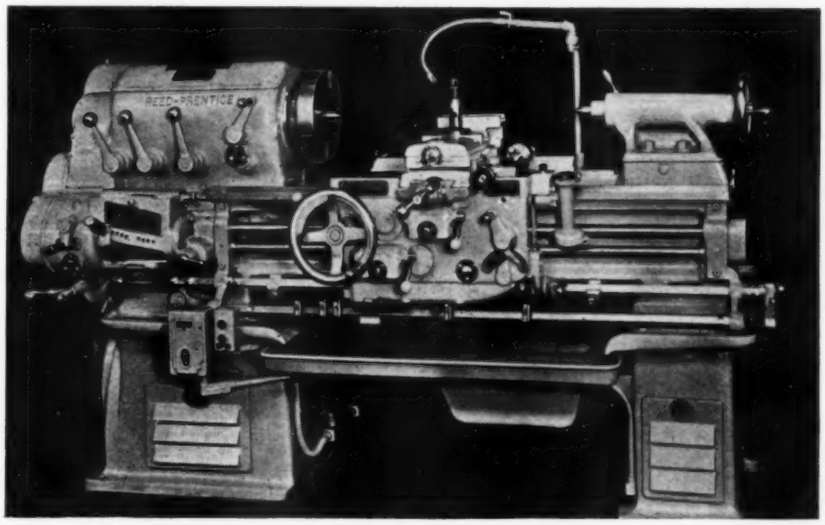
HEAVY-DUTY GRINDERS—*Standard Electrical Tool Co., 1940 W. 8th St., Cincinnati, Ohio.* A new line of 12-in. and 14-in. heavy duty wet grinders features a wet grinding hood with integral splash bowl and adjustable work rest. Also available as a combination wet and dry grinder. Vol. 85, p. 674.



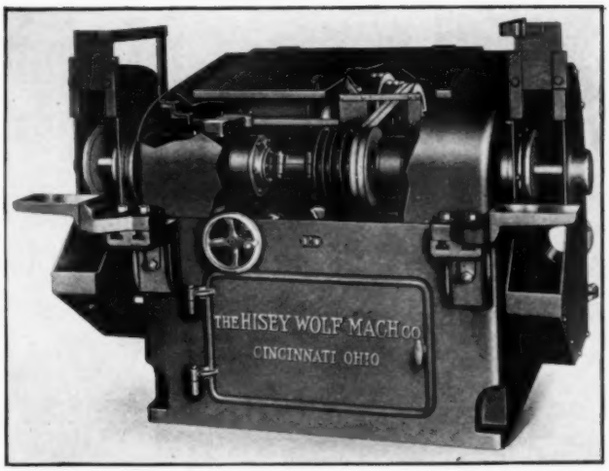
TOOL GRINDERS—*Hammond Machinery Builders, Inc., 1618 Douglas Ave., Kalamazoo, Mich.* Three Model "OK" grinders have been introduced for tool and light snag grinding with wheels of 10, 12 or 14 in. diameter driven by 1, 2 or 3 hp., 220 or 440 volt, three-phase, 60-cycle a.c. motors. Vol. 85, p. 938.



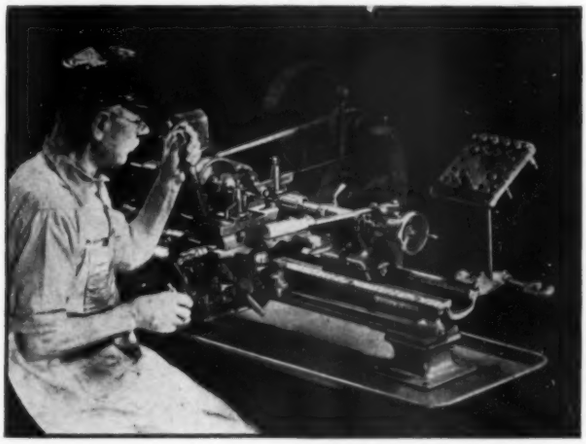
ENGINE LATHE—*Seneca Falls Machine Co., Seneca Falls, N. Y.* The Star 14-in. engine lathe for repairing U. S. Army rifles, guns, tanks and trucks in the field has been redesigned with removable gap block for mobile service. This light-weight lathe (1,700 lb., not including motor or equipment) can handle work with large diameter flanges. Swing over bed, 14⅛ in.; swing over gap, 21 in.; distance between centers, 36 in. Vol. 85, p. 892.



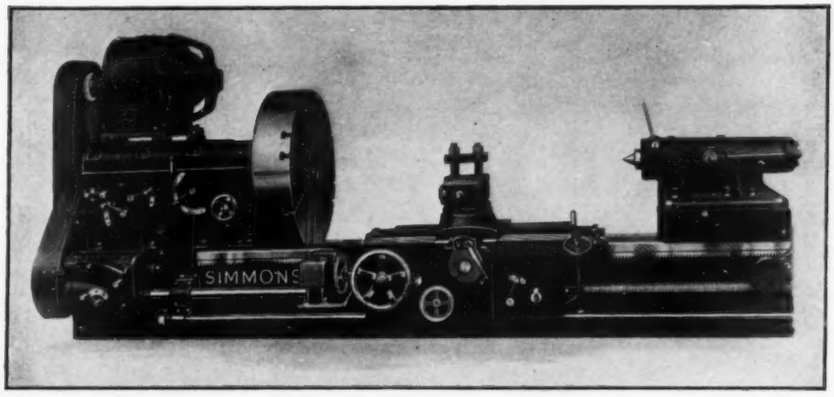
ENGINE LATHES — *Reed-Prentice Corp., Worcester, Ohio.* Lathes manufactured by this company now feature automatic multiple length stops for accurately duplicating shoulder lengths, and adjustable multiple cross stops for accurately duplicating diameters on repetition work. The machines are also furnished when desired with front and rear tool blocks, for which there is an increasing demand in many industries. Vol. 85, p. 730.



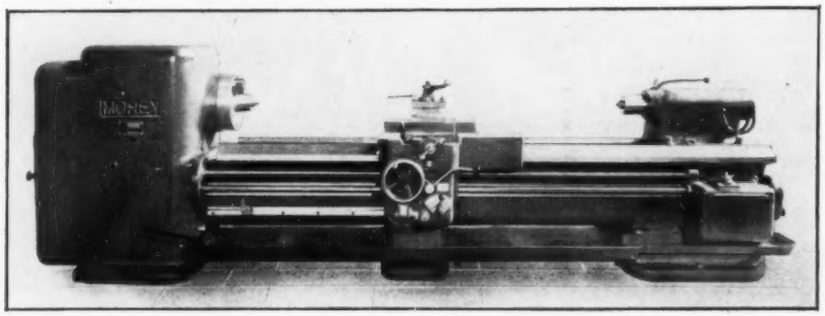
SNAGGING GRINDERS—*Hisey-Wolf Machine Co., Cincinnati, Ohio.* A line of snagging grinders for high-speed wheels are built in 18-, 20-, 24- and 30-in. wheel sizes. Vol. 85, p. 33.



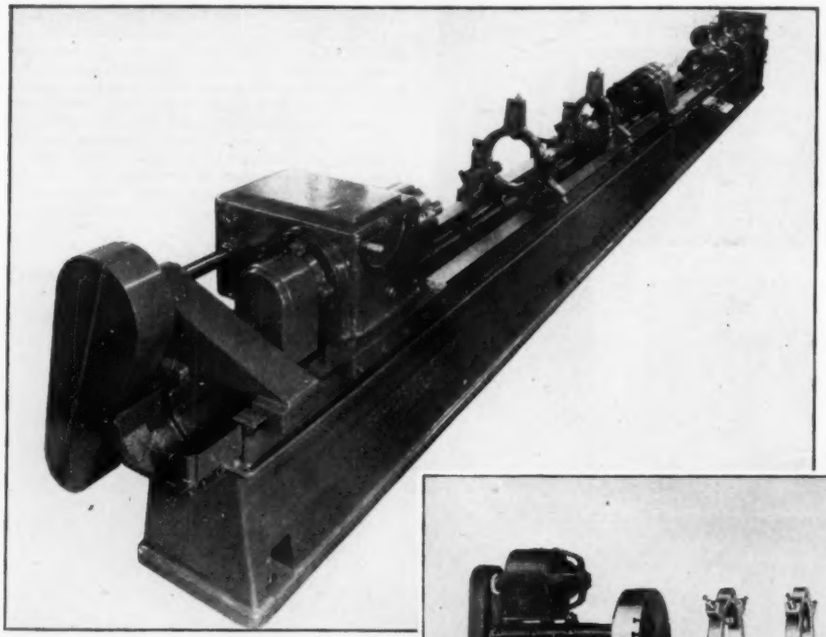
BENCH LATHES—*South Bend Lathe Works, South Bend, Ind.* The Model A 9-in. swing toolroom precision lathe has a maximum collet capacity of ½ in., maximum swing over bed ways of 9½ in., and a maximum swing over saddle cross slide of 5½ in. Vol. 85, p. 316.



ENGINE LATHE—*Simmons Machine Tool Corp., Albany, N. Y.* The 48-in. engine lathe designed for heavy machining operations has an extra wide bed to give ample support to the carriage and firm foundation for headstock and tailstock. Swing over bed, 50 in.; swing over carriage, 36 in.; distance between centers with 20 ft. bed, 10½ ft.; range of nine spindle speeds, 1.9 to 112 r.p.m. Vol. 85, p. 671.



MANUFACTURING LATHE—*Morey Machinery Co., 410 Broome St., New York, N. Y.* Built for heavy-duty work on single-purpose operations, the 27-in. manufacturing lathe turns at maximum speeds and feeds possible with tungsten carbide tools, has a swing over ways of 28 in., swing over carriage slide of 11 in. Vol. 85, p. 510.

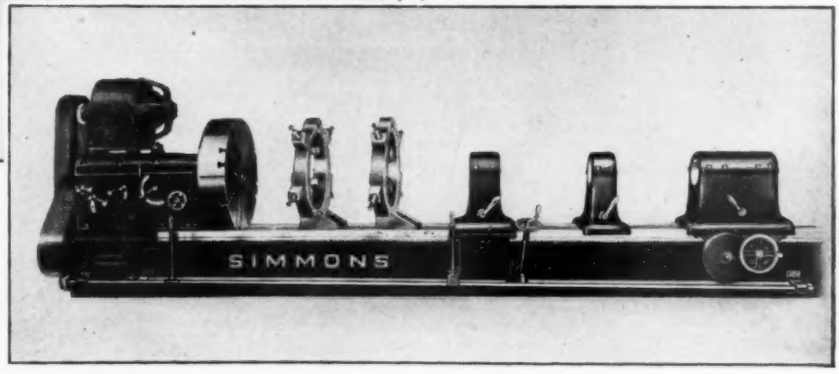


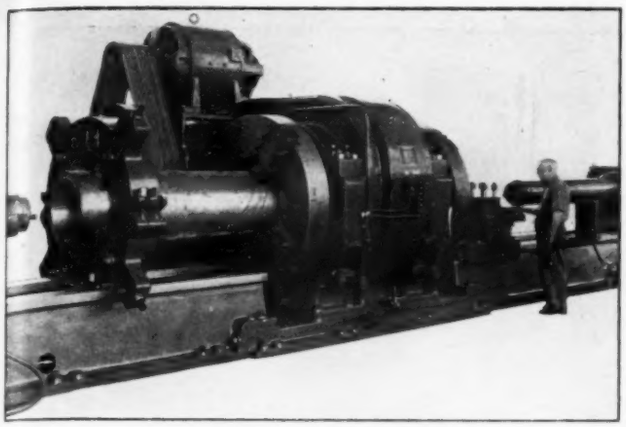
GUN BORING LATHE—*Builders Iron Foundry, 9 Codding St., Providence, R. I.* The No. 3 gun barrel boring machine will handle barrels up to 105-mm. bore. Barrels, mounted in headstock, are driven by a four-speed a.c. motor at 20 to 375 r.p.m. Fourteen feed rates are provided for the boring bar, ranging from 0.2 to 3 in. per minute. Standard bore length is 156 in. Vol. 85, p. 1000.

ENGINE LATHES—*Sheldon Machine Co., Inc., 1624 N. Kilbourn Ave., Chicago, Ill.* Both bench and floor types with semi-quick or full-quick change gear boxes are available in these 11-in. and 12-in. lathes with pre-loaded ball or precision roller bearing headstocks. Lathes have a 1-in. capacity spindle hole. Vol. 85, p. 626.

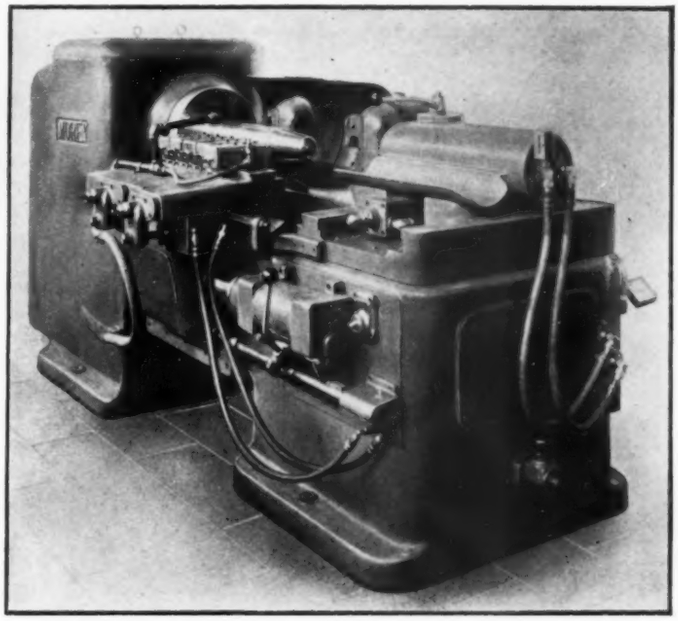
ENGINE LATHE—*Logan Engineering Co., 4912 Lawrence Ave., Chicago, Ill.* With this general-purpose, back-geared metal-cutting 10-in. swing lathe with 24 in. between centers, threads from 4 to 216 per in. can be cut. Vol. 85, p. 199.

GUN BORING LATHE—*Simmons Machine Tool Corp., Albany, N. Y.* The four-speed headstock of the 54-in. heavy duty boring lathe gives spindle speeds from 1.6 to 50 r.p.m.; the six-speed headstock gives spindle speeds from 1.8 to 38 r.p.m. Motor recommended, 30 to 50 hp.; swing over bed, 55½ in.; swing over carriage, 42 in.; maximum boring length with one setting (40 ft. bed), 13 ft.; hole through spindle, 2¾ in. Vol. 85, p. 828.



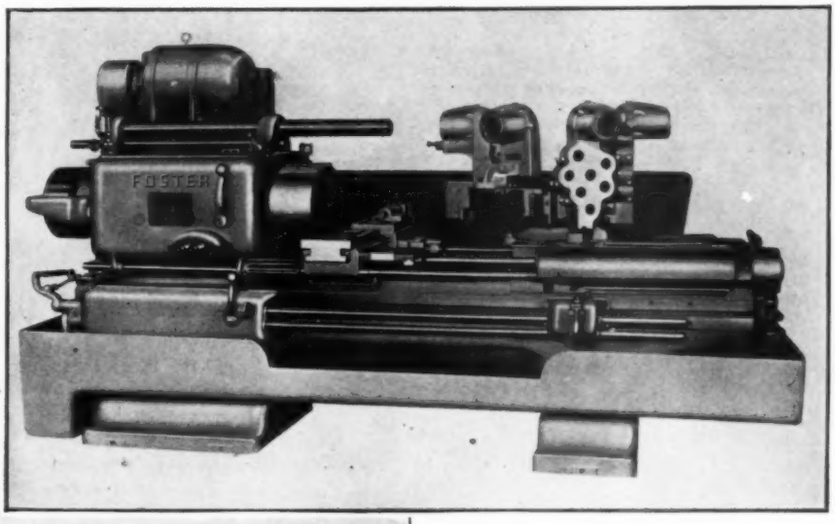


DOUBLE-END BORING LATHE—*Wickes Bros., Saginaw, Mich.* This double end boring lathe for hollow steel forgings has a 30 in. hollow spindle and a 25 ft. bed length on each end. The ends are equipped with 12 in. × 20 ft. forged steel boring bars. A 50-hp. motor drives work through faceplates. Vol. 85, p. 942.

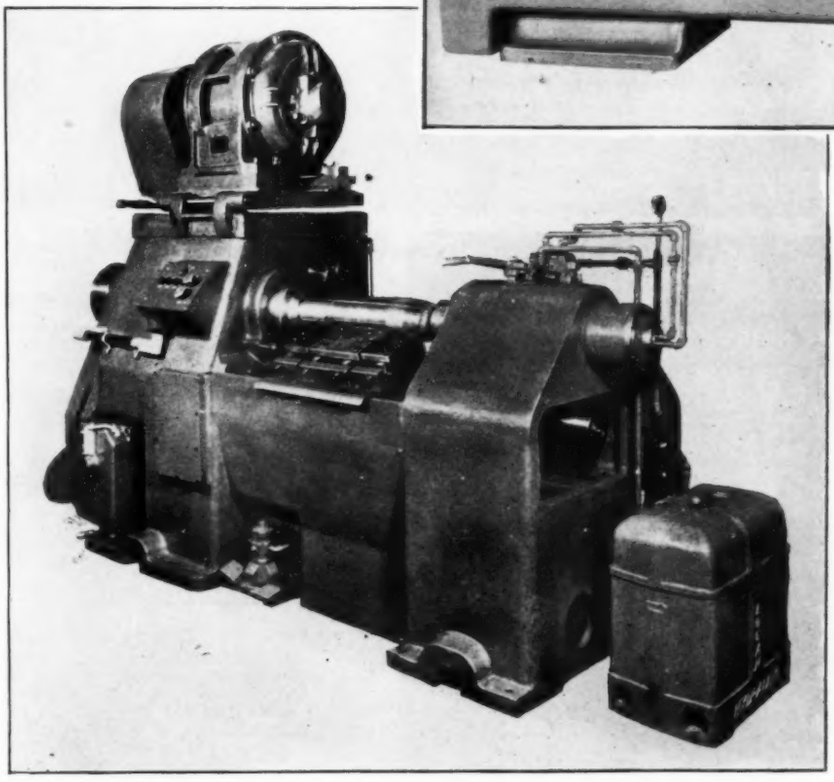


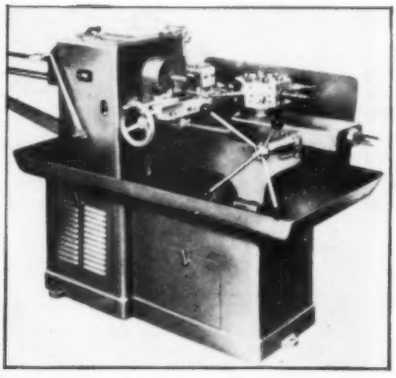
SEMI-AUTOMATIC LATHE—*Morey Machinery Co., 410 Broome St., New York, N. Y.* Capable of being supplied in many variations to suit specific requirements, the Model 27 semi-automatic hydraulic lathe is easily tooled up for rough turning shell forgings from 105 to 155 mm. The machine is entirely self-contained and is equipped with a 35 to 100-hp. motor for driving the headstock. Vol. 85, p. 407.

TURRET LATHE—*Foster Machine Div., International Machine Tool Co., Elkhart, Ind.* No. 1-F "Fastermatic" turret lathe features automatic spindle speed changes which are selected by means of a spool on the machine front. The machine has a regular range of 27 spindle speeds from 22 to 332 r.p.m. Swing over bed, 21 in. Vol. 85, p. 31. →



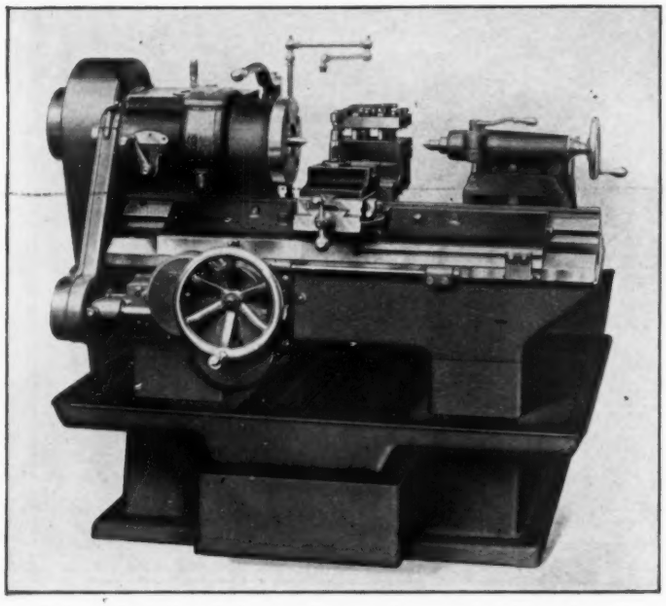
SHELL TURNING MACHINE—*National Machine Tool Builders' Association, Cleveland, Ohio.* The line of machines designed by the association for making shell are of simple construction so they can be built quickly. They can produce shell economically and are automatic so they can be handled by unskilled operators. Vol. 85, p. 183.

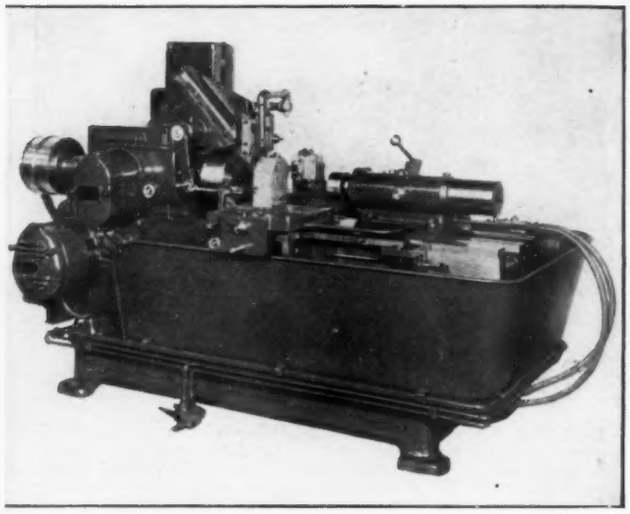




TURRET LATHE—*Oster Mfg. Co., 2057 E. 61st Pl., Cleveland, Ohio.* When equipped with a six-station turret, the No. 601 "Rapiduction" lathe satisfies the demand for a simple, plain head, hand-operated screw machine which does not require a highly skilled operator. Vol. 85, p. 366.

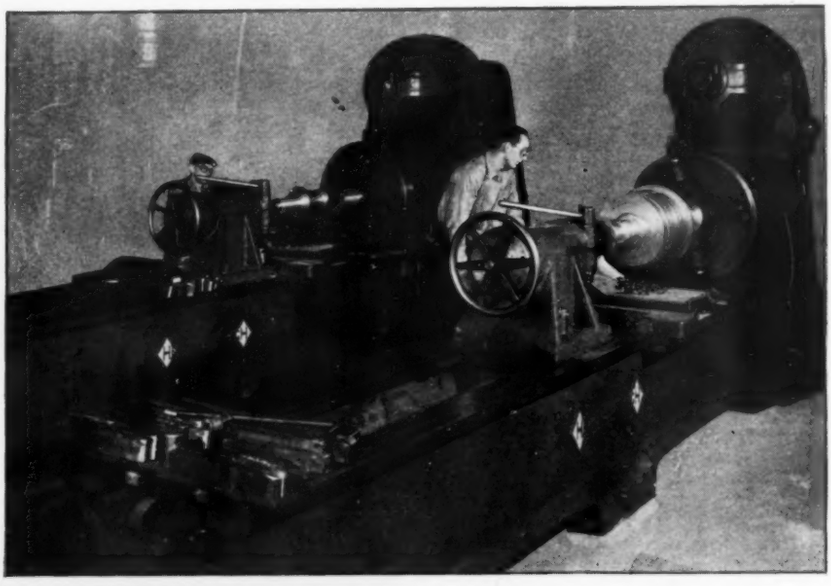
MACHINE TOOLS—Lathes





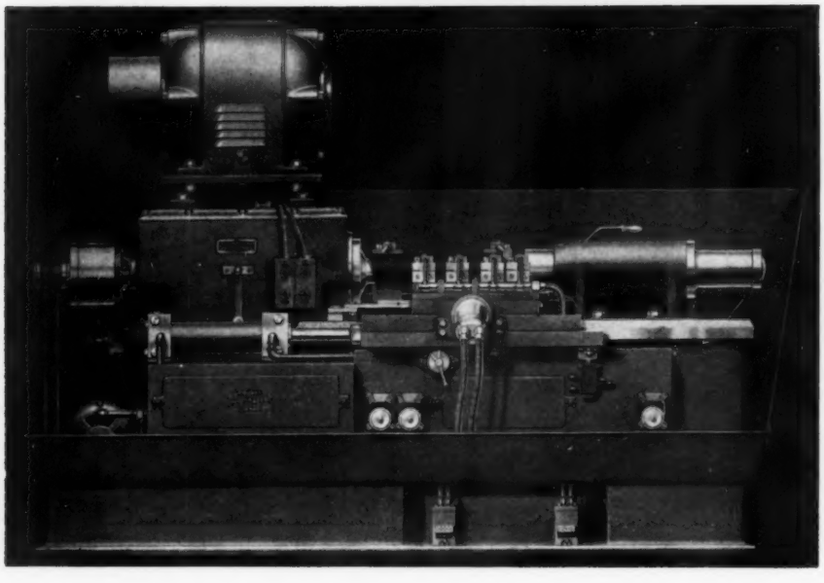
AUTOMATIC LATHES—*Sundstrand Machine Tool Co., Rockford, Ill.* The Model 10 automatic lathe for turning 3-in. A.A. shell made from tubing produces 18 pieces per hr. at 85 percent efficiency with tungsten-carbide tipped tools, speed of 280 ft. per min., and feed of 0.020 in. Equipped for turning the copper rotating band, the Model 10 automatic lathe handles four different sizes of shell: the 105-mm., the 155 mm., the 5-in. common projectile, and the 5-in. A.A. Navy shell, all having different types of bands. Vol. 85, p. 624.

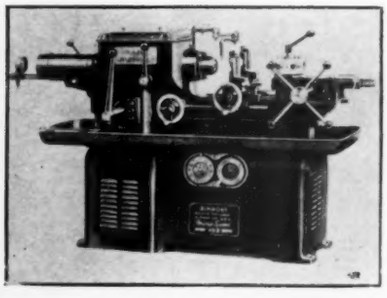
AUTOMATIC LATHES—*The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio.* The 6-in. and 9-in. "Multi-Cut" lathes are designed for easy set-up of separate tools for turning, facing, necking and grooving. Operation is completely automatic. Vol. 85, p. 85.



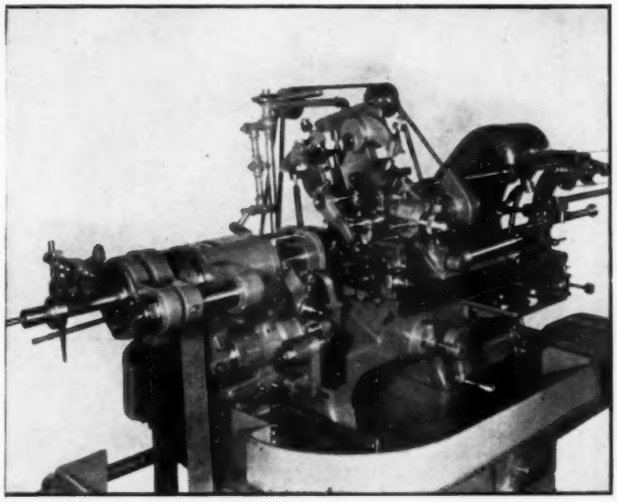
ROUGHING LATHE—*Heppenstall Co., Pittsburgh, Pa.*, and *Lewis Foundry & Machine Div., Blaw-Knox Co., Pittsburgh, Pa.* Unusual features of this heavy-duty roughing lathe include hydraulic feed, live tailstock center and selective stepless speeds and feeds. Swing over bed, 36 in.; swing over carriage, 20 in.; distance between centers, 20 ft.; height of centers above bed, 16 in.; spindle speed, 10 to 40 and 40 to 160 r.p.m. Vol. 85, p. 313.

SEMI-AUTOMATIC LATHE—*Sparks Machine Tool Corp., 35 Park Hill Ave., Norwalk, Conn.* Equipped for automatic operation with hydraulic feeds and hydraulically operated duplex brake and clutch, this Hydra-Feed lathe is suitable for all operations on shell bodies from 75 to 155 mm. Vol. 85, p. 564.



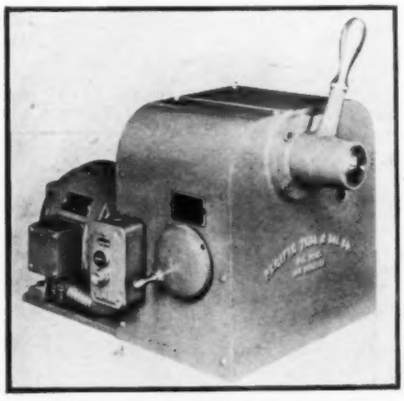


TURRET LATHE—*Simmons Machine Tool Corp., Albany, N. Y.* A cabinet base and selector dial control have been added to the design of the No. 2 turret screw machine (AM—Vol. 84, page 733). All electrical equipment is mounted within the base and selector dial control is located on the front within instant reach of the operator. Vol. 85, p. 568.

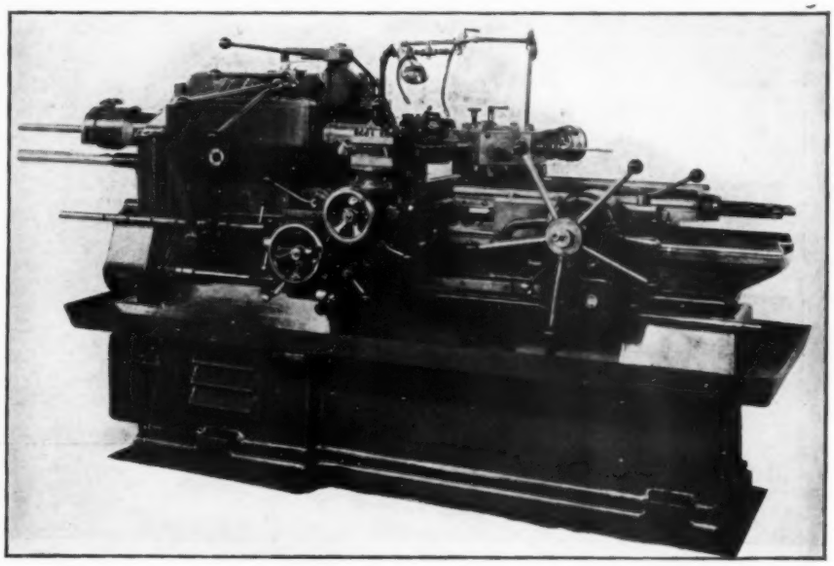


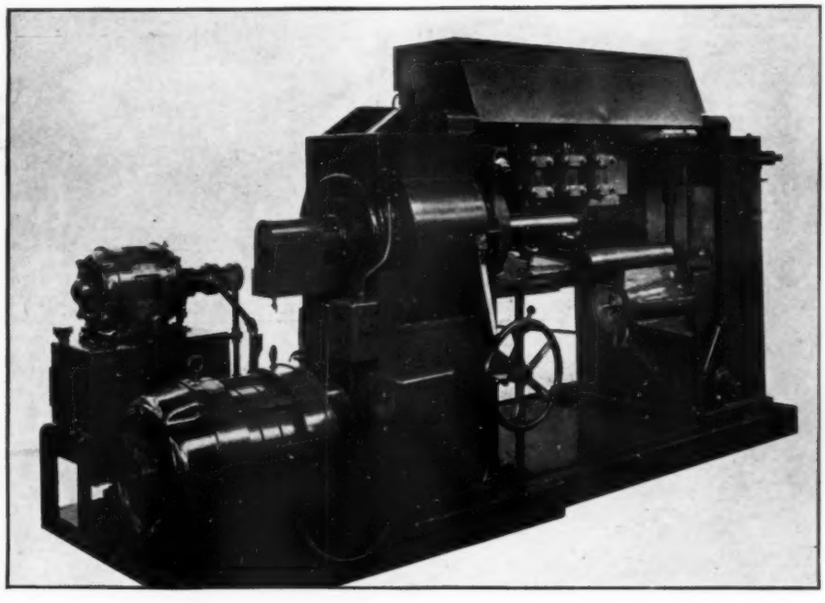
AUTOMATIC SCREW MACHINE—*Triplex Machine Tool Co., 125 Barclay St., New York, N. Y.* This Swiss type automatic screw machine of American manufacture has a round stock capacity of ⅜ in., will turn pieces 1½ in. long with a flat feed cam or 2¾ in. long with a bell cam. This machine is motor driven, with speeds up to 6,100 r.p.m. Vol. 85, p. 900.

SCREW MACHINE—*Unit Machinery Co., Rockford, Ill.* Equipped with a pick-up slide attachment which produces cut-off pieces without burr and separates the parts from the chips, the No. 11 "Polymatic" high speed screw machine can rapidly produce accurate parts from stock as small as fine wire. Vol. 85, p. 458.



COLLET LATHE—*Pacific Tool & Die Co., 1225 E. 63 St., Los Angeles, Calif.* Work is fed into the collet of the Vera-Lathe while the machine is running, saving at least 75 percent chucking time on small parts. Machine is 12 in. high, 13 in. wide and 23 in. long. Spindle speed, 1,250 to 5,000 r.p.m. with ½ hp. motor. Vol. 85, p. 1238.

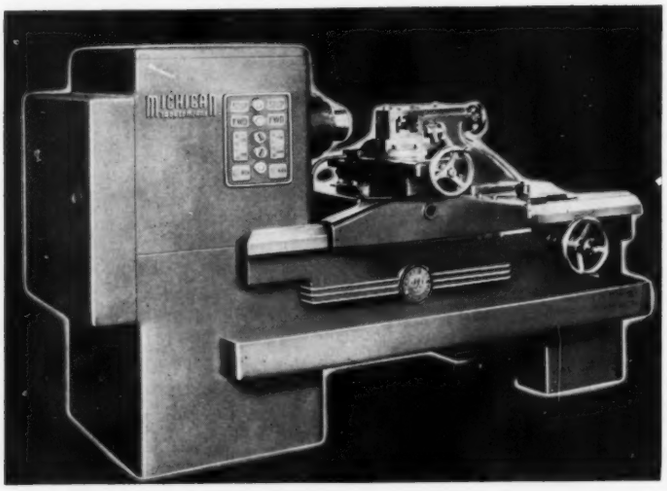




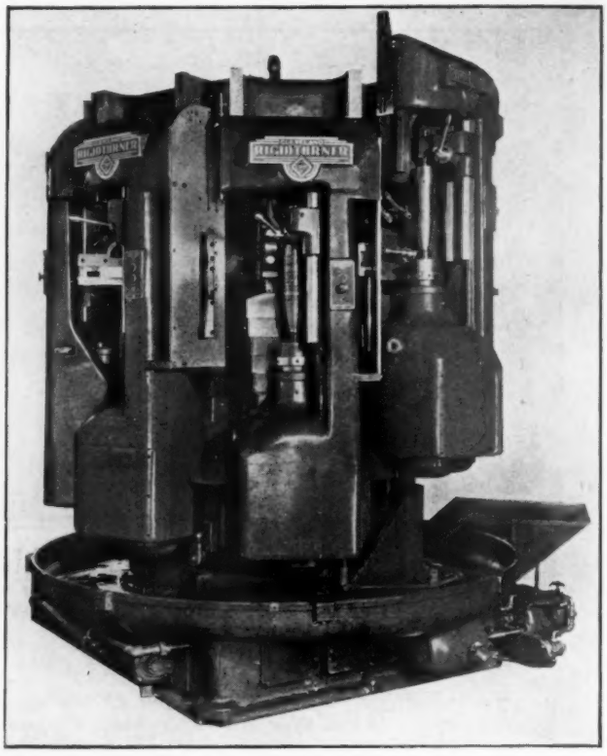
TURRET LATHE—*Merritt Engineering & Sales Co., Inc., Lockport, N. Y.* The No. 4 turret lathe has an automatic chuck and bar feed. Spindle has 12 speeds from 55 to 715 r.p.m. Universal carriage, reversible in the apron, has six feed changes for cross and longitudinal feed, and an additional range of six obtained through the gear box at the headstock. Longitudinal travel is 24 in., cross travel 11 in. Thread chasing and taper attachments can be furnished. Vol. 85, p. 1287.

SHELL TURNING LATHE—*Federal Machine & Welder Co., Warren, Ohio.* The design of this special shell turning lathe was completely engineered by Britannia Machine Tool Co., Ltd., England. From eighteen to twenty British 5½-in. shell, 27 in. long, can be rough turned per hour on this machine without fatigue by unskilled operators. Vol. 85, p. 456.

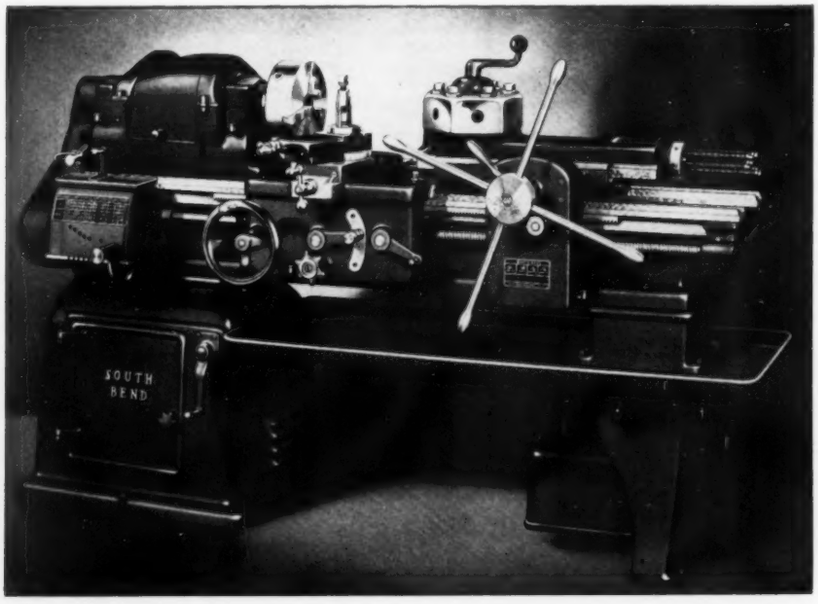
MACHINE TOOLS—Lathes



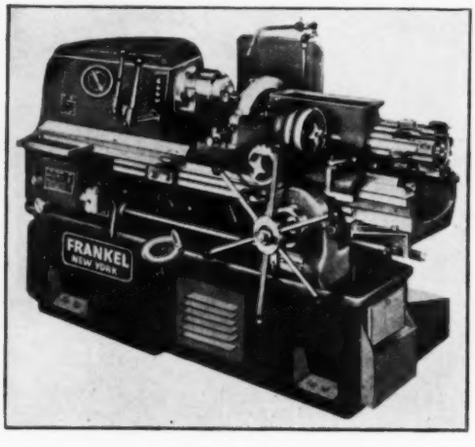
CUTTER RELIEVING MACHINE—*Michigan Tool Co., Detroit, Mich.* Suitable for relieving form, gear and rack cutting tools, and milling cutters, spot facers, and similar rotary tools, this universal cutter relieving machine has been developed to handle work up to 8 in. in diameter, with maximum length between centers of 24 in. Number of teeth that can be relieved ranges from 1 to 24. Maximum relieving stroke is ¾ in. Vol. 85, p. 732.



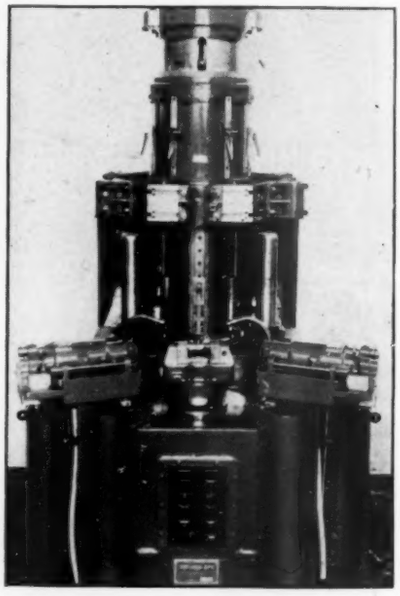
VERTICAL TURNING MACHINE—*Cleveland Hobbing Machine Co.,* 1170 *East* 152*nd St., Cleveland, Ohio.* A new machining principle, known as mold turning, for high-production turning of multiple-diameter work having straight, tapered or formed sections, has been incorporated in the "Rigidturner" vertical turning machine. Single- and eight-spindle machines are being built for turning diameters and tapers on cluster-gear shafts and turning the spherical end on variable-ratio universal joints. For shell turning, the rotary machine with a different head and a carbide tool is used. Vol. 85, p. 623.



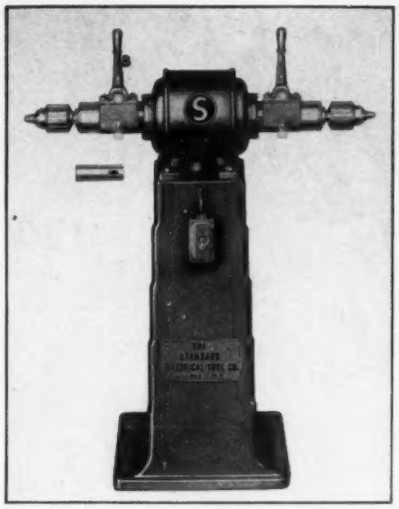
TURRET LATHE—*South Bend Lathe Works,* 426 *East Madison St., South Bend, Ind.* This 16-in. turret lathe has been designed for rapid production on chucking operations and bar work. The ram type turret has both power and hand feed, with automatic indexing and individual stop for each of the six turret faces. Swing over bed ways, 16¼ in.; swing over tool post saddle cross slide, 9⅝ in.; collet capacity, 1 in. Gear box provides 48 feeds. Vol. 85, p. 995.



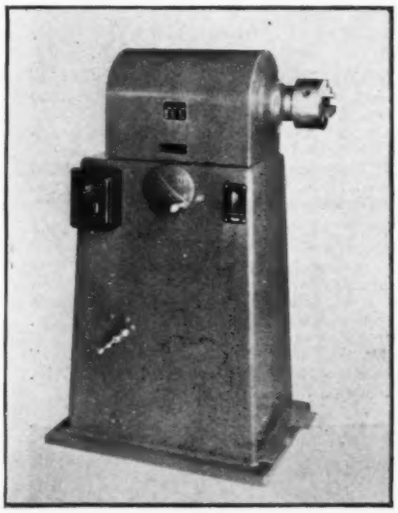
MULTIPLE-TOOL LATHE—*Frankel Machinery Corp.,* 118 *East* 28 *St., New York, N. Y.* The customary cross slide is eliminated on the Type 2FR multiple tool lathe because of the large face plate type turret which revolves around a horizontal axis and replaces the customary vertical mounting of other designs of ram or saddle turret lathes. All standard box or shank type tools can be mounted in the 15 in. diameter turret, which provides for 16 tool positions near its circumference. Vol. 85, p. 1343.



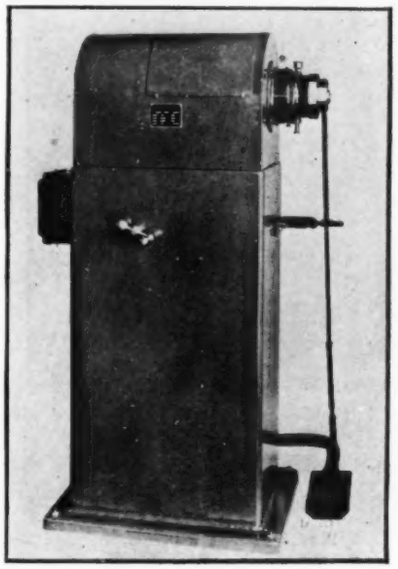
AUTOMATIC CHUCKING MACHINE—*Production Machinery Development Co.,* 4845 *St. Aubin Ave., Detroit, Mich.* This automatic chucking machine has a rigid central column bearing a six-faced turret, which reciprocates vertically and rotates by a selective indexing mechanism, and two side heads, mounted at the front of the machine, having 12 in. vertical and 3½ in. horizontal movement. Vol. 85, p. 1345.

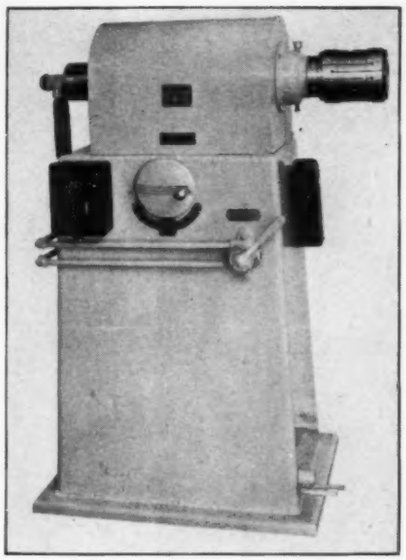


DOUBLE-END SPEED LATHE — *Standard Electrical Tool Co., 1940 W. 8th St., Cincinati, Ohio.* Available in ½, 1 and 2 hp. sizes with any standard motor speed, double-end speed lathes have individually controlled spindle at each end. Vol. 85, p. 562.

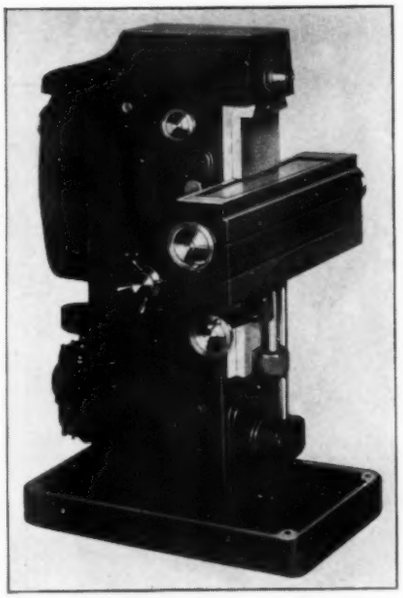


SPEED LATHE—*Schauer Machine Co., 2063 Reading Rd., Cincinnati, Ohio.* The Type VA3B variable speed lathe is capable of lapping gages and other small parts at speeds as low as 20 r.p.m. and rotates heavy work at 4,000 r.p.m. Vol. 85, p. 186.





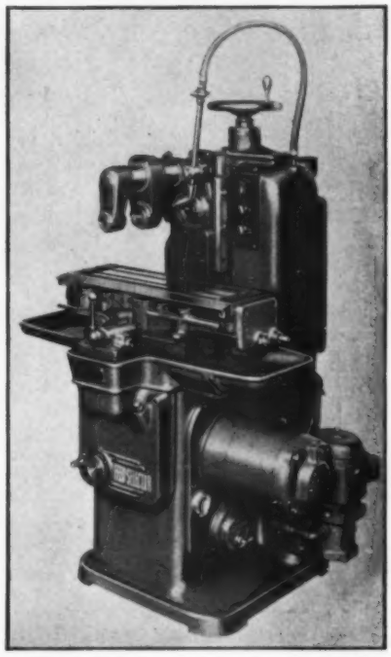
VARIABLE SPEED LATHE—*Schauer Machine Co., 2063 Reading Road, Cincinnati, Ohio.* Designed especially for polishing and finishing engine barrels of aircraft engines, this variable speed lathe provides spindle speeds between 25 and 4,000 r.p.m. Air operated mandrel is controlled by hand or foot valve. Vol. 85, p. 1344.



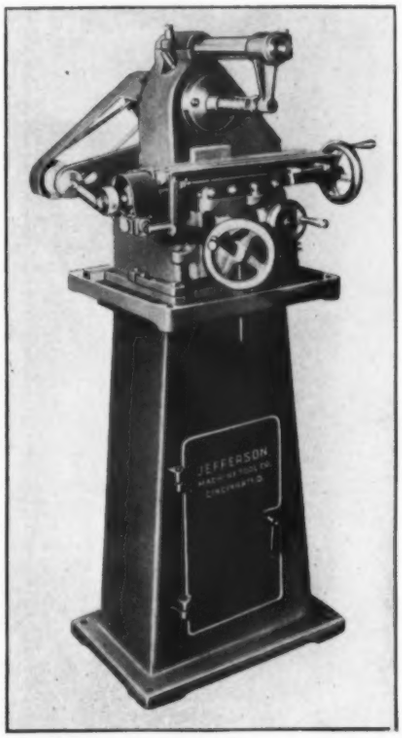
MILLING MACHINE — *Portman Machine Co., 17 and 19 Beechwood Ave., Mt. Vernon, N. Y.* Vertical mounting of the carriage table on this milling machine permits mounting unusually large work pieces or bulky fixtures under the spindle. Vertical table pivots 180 deg. and is adjustable to 45 deg. from horizontal. A right-angle table can be mounted on vertical table to provide horizontal working surface. Vol. 85, p. 1117.

←

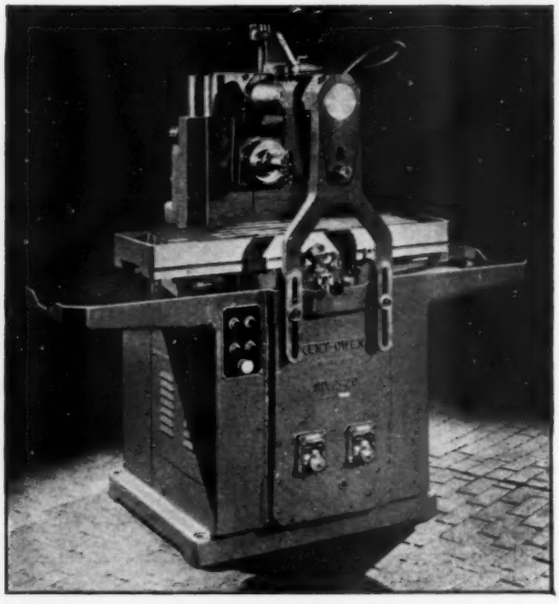
SPEED LATHE—*Schauer Machine Co., 2063 Reading Rd., Cincinnati, Ohio.* The Model VAIE variable speed lathe for accurate lapping and polishing of small parts is equipped with a treadle for opening motor circuit and applying an automatic brake to the spindle. Speed range, 20 to 4,000 r.p.m. Vol. 85, p. 891.



"RIGIDMIL" — *Sundstrand Machine Tool Co., Harrison and 11th Sts., Rockford, Ill.* The No. 00 "Rigidmil" is available with either power feed or hand feed for production milling of small parts. Two heads are available with speeds from 57 to 2,415 r.p.m. and from 85 to 3,600 r.p.m. Vertical feed stroke of head is 2 in. Feed ranges from ½ to 37 in. per min., and from 1¼ to 66 in. per min. in two ranges. Vol. 85, p. 264.

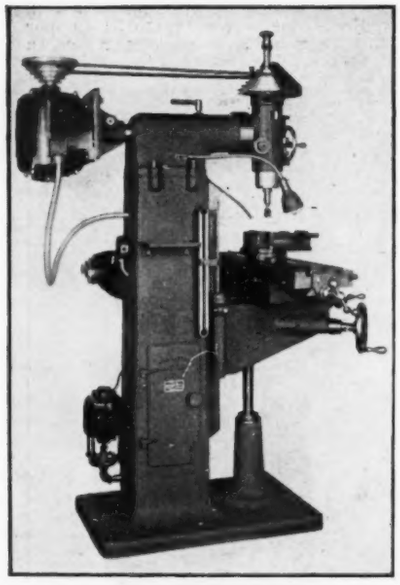


MILLING MACHINE—*Jefferson Machine Tool Co., 4th, Cutter and Sweeney Sts., Cincinnati, Ohio.* Available in floor base or bench models with hand or power feed, this precision milling machine has a working surface of 14×43/8 in. Longitudinal and transverse feeds of table are 7 and 3 in. respectively. Vol. 85, p. 1288.

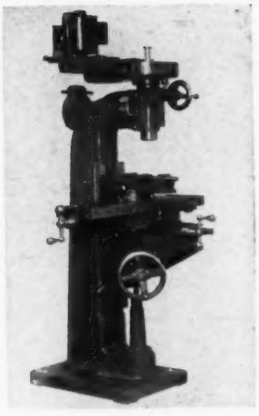


PRODUCTION MILLER — *Kent-Owens Machine Co., 958 Wall St., Toledo, Ohio.* No. 2-20 automatic milling machine has independent feed rate adjustment. A medium spindle speed range of 64 to 860 r.p.m. is standard, while a low range of 32 to 428 or a high range of 96 to 1,284 r.p.m. can be provided. Vol. 85, p. 85.

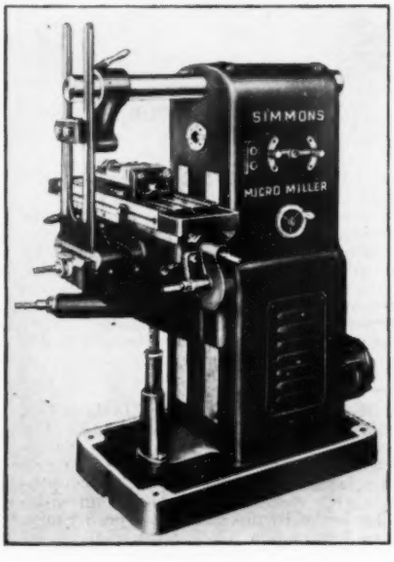
← PRODUCTION MILLER—*Van Norman Machine Tool Co., Springfield, Mass.* General specifications of the Model No. 118 milling machine for the production of small and medium size parts are: longitudinal power feed, 18 in.; table feed, ⅛ to 40 in. per min.; rapid traverse, 200 in. per min.; vertical movement of head slide, 7½ in.; minimum distance between table and spindle, 2¾ in. Vol. 85, p. 898.



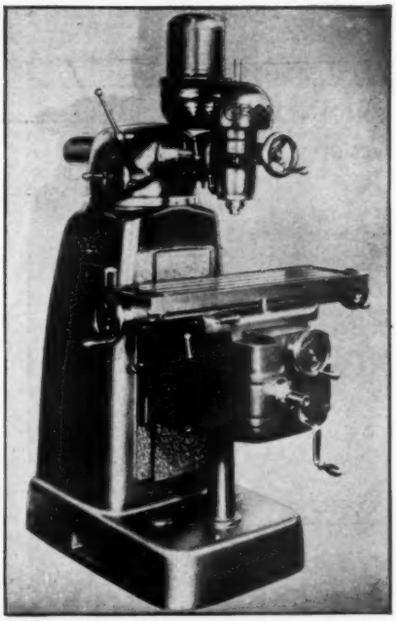
VERTICAL MILLER — *Midway Machine Co., 2324 University Ave., St. Paul, Minn.* An addition to the "Millmaster" line of milling machines is a model equipped with a two-speed motor and special controller, designed for special application where very rapid speed changes are necessary. Speed ranges from 130 to 4,400 r.p.m. in 14 steps. Vol. 85, p. 34.



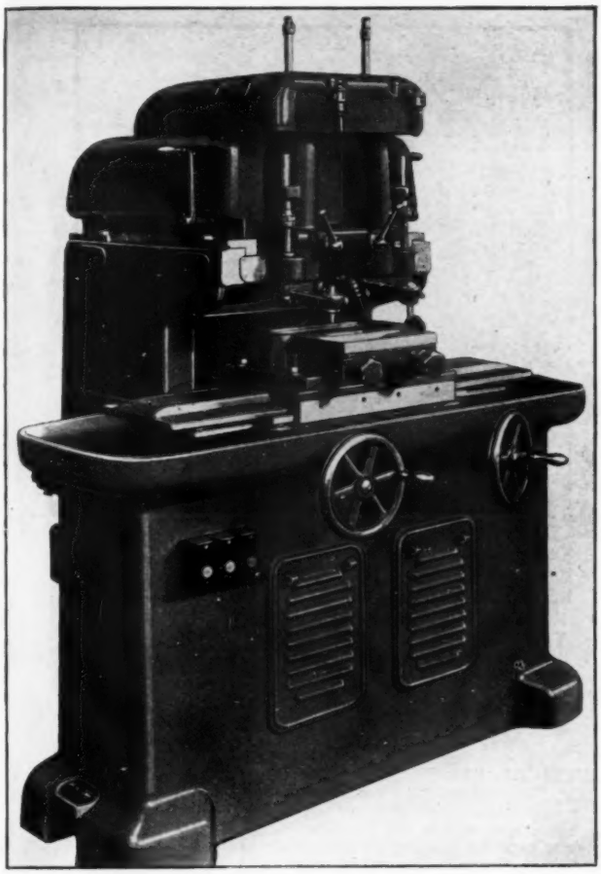
← VERTICAL MILLER—*Blank & Buxton Machinery Co., Jackson, Mich.* The No. 40-H index high-speed vertical mill has a capacity of ⅛ to ⅝ in. end mills in tool steel, and has six standard spindle speeds ranging from 180 to 2,400 r.p.m. with single-speed motor. Spindle travel is 3¼ in., while distance from end of spindle to table varies from 0 to 16 in. Vol. 85, p. 199.



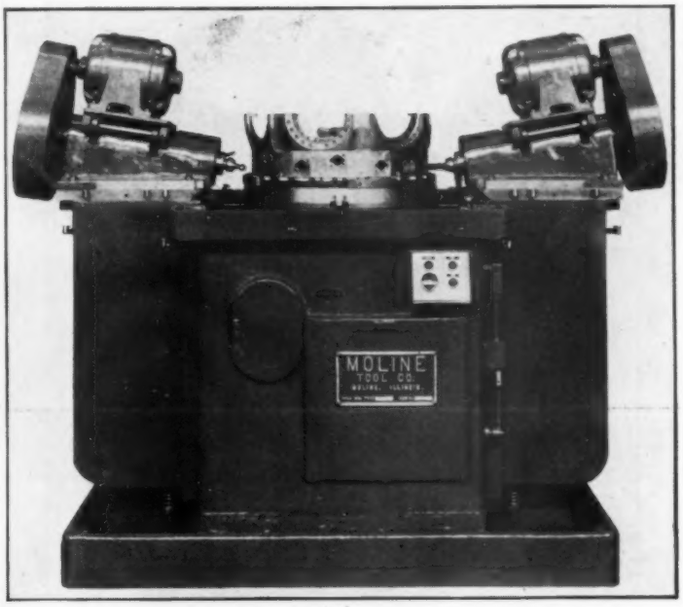
MILLING MACHINE—*Simmons Machine Tool Corp., Albany, N. Y.* Having the following range of feeds: longitudinal, 34 in.; cross, 8 in.; and vertical, 18 in., the No. A-1 "Micro-Miller" has been developed for use in plants manufacturing small firearms and airplane parts, in toolrooms and repair shops and in similar applications. Table measures 27×8 in. Vol. 85, p. 357.



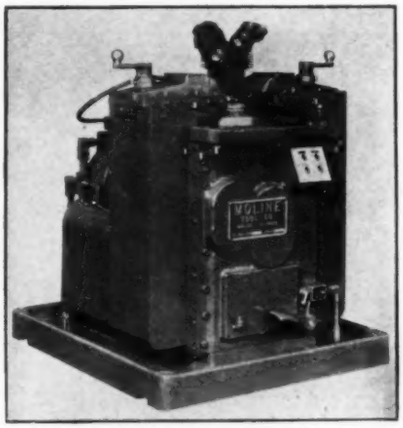
VERTICAL MILLER—*Cross Gear & Machine Co., 3250 Bellevue Ave., Detroit, Mich.* The No. 20 Universal milling machine, with cutter spindle adjustable to any angle in any plane, can be used for a wide variety of work. With an 1,200 r.p.m. motor, spindle speeds are available from 350 to 3,880 r.p.m. Vol. 85, p. 995.



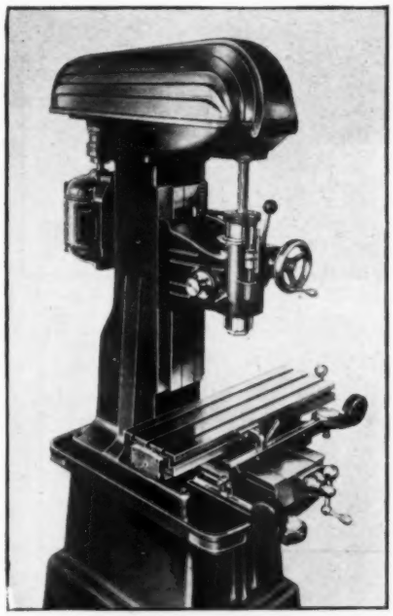
HAND PROFILER—*National Broach & Machine Co., 11457 Shoemaker St., Detroit, Mich.* Intricate mechanical parts can be machined by the Red Ring profiler. Head carries two cutter spindles, on 10-in. centers, which can be used simultaneously. By locking head or table slide, linear milling may be done without using pattern. End mills up to ¾-in. diameter may be used. Vol. 85, p. 996.



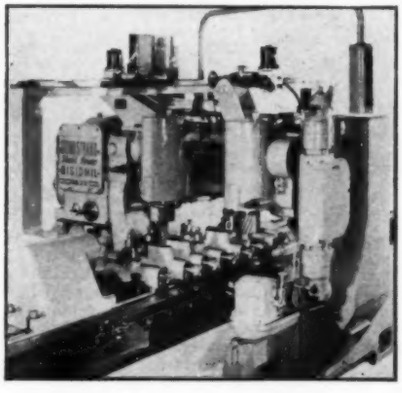
BOLT HOLE MILLER—*Moline Tool Co., Moline, Ill.* Spherical clearances in the ends of bolt holes in crankcase sections of radial-type aircraft engines are milled two at a time with the No. 28 machine. Cycle is automatic. Vol. 85, p. 1172.

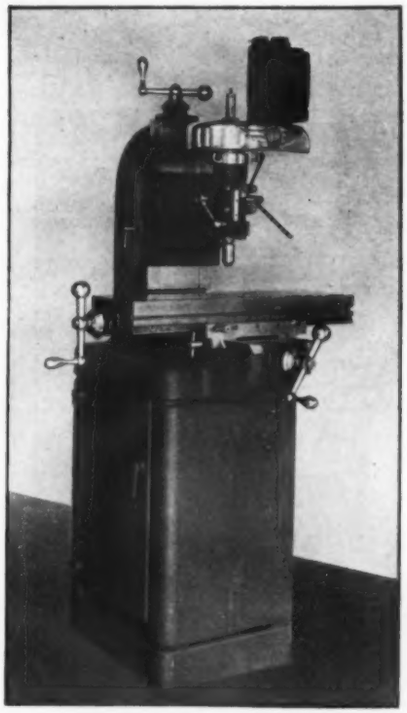


BACKFACING MILLER—*Moline Tool Co., Moline, Ill.* The No. 24 miller for backfacing bolt holes in the flanges of radial engine cylinders is designed so that the cutters are not withdrawn until work is removed from fixture. Operator loads the fixture, puts cutters in place, and indexes work. Vol. 85, p. 828.



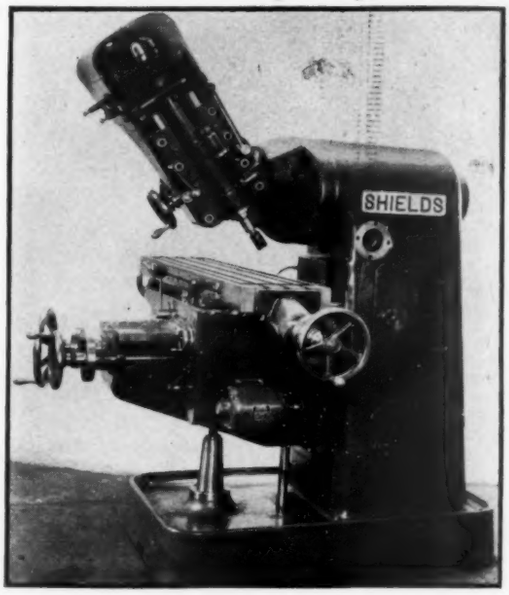
MILLER AND JIG BORER—*Machinery Mfg. Co., 1915 51st St., Vernon, Los Angeles, Calif.* The Vernon vertical miller and jig borer is furnished with two dial indicators and seven measuring rods for jig boring operations. Dials are large and easy to read. Vol. 85, p. 405.





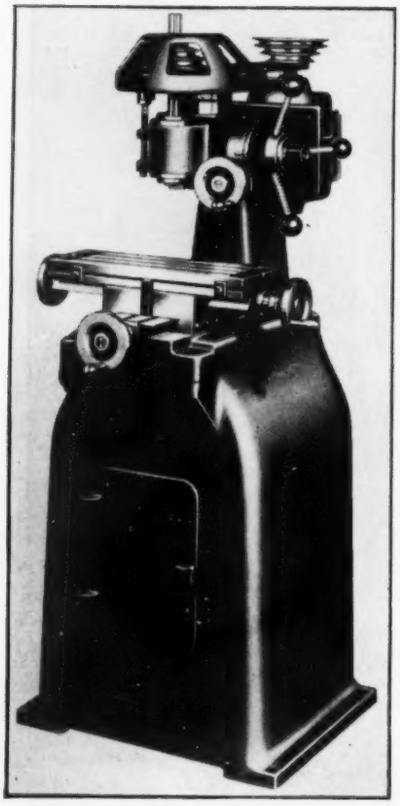
VERTICAL MILLER—*Marburg Bros., Inc., 90 West St., New York, N. Y.* The Holland vertical milling machine has longitudinal hand feed of 16 in.; cross feed of 8 in., and vertical feed of 8 in. Distance from spindle to table is 11 in. There are seven spindle speeds from 525 to 4,000 r.p.m. Collet capacity is ½ in., and quill travel is 3 in. Vol. 85, p. 729.

PROPELLER EDGE MILLER—*Sundstrand Machine Co., 2561–11th St., Rockford, Ill.* This automatic machine for milling the edges of propeller blades, built around the fluid screw Rigidmil, is provided with two vertical type spindle heads mounted on a cross-rail for simultaneously milling both sides of the blade. Cycle is automatic. Vol. 85, p. 1287.



VERTICAL MILLER—*Shields Mfg. Co., Inc., 38-09 24th St., Long Island City, N. Y.* End mills from ⅛ to ¾ in. and face mills up to 6 in. can be used on the No. 3 vertical milling machine with universal head. Head can be turned 33 deg. backward or forward and swiveled 360 deg. Vol. 85, p. 1070.

VERTICAL SLOTTER—*Hunter Engineering Co., Riverside, Calif.* Designed for die shop, toolroom and repair shop operation, this compact variable-speed vertical slotter has a ram which can be tilted right or left 10 deg. for cutting tapered keyways. Maximum ram stroke is 4½ in. Operating speed can be regulated from 90 to 180 strokes per minute. Vol. 85, p. 626.



MILLING MACHINE—*Granite State Machine Co., Inc., 448 Silver St., Manchester, N. H.* The No. 0 vertical milling machine is useful in the manufacture of small parts for instruments, arms and munitions. Spindle is driven either at speeds from 276 to 2,811 r.p.m. or at speeds from 240 to 4,277 r.p.m. Vol. 85, p. 1117.

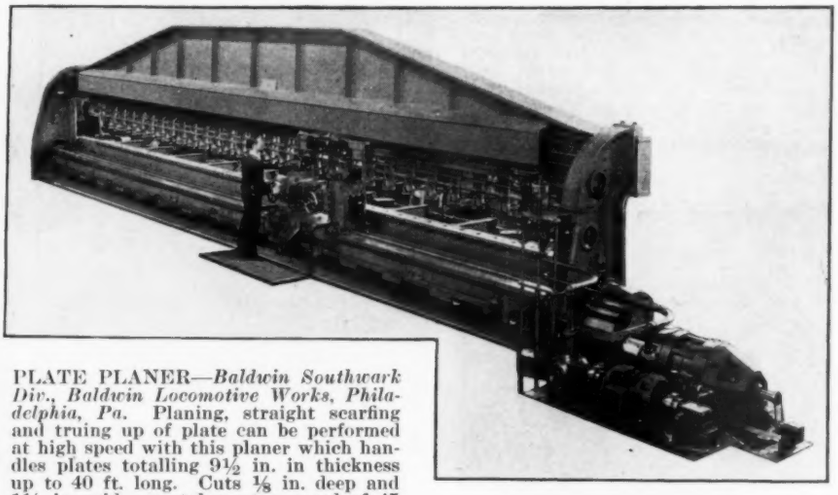
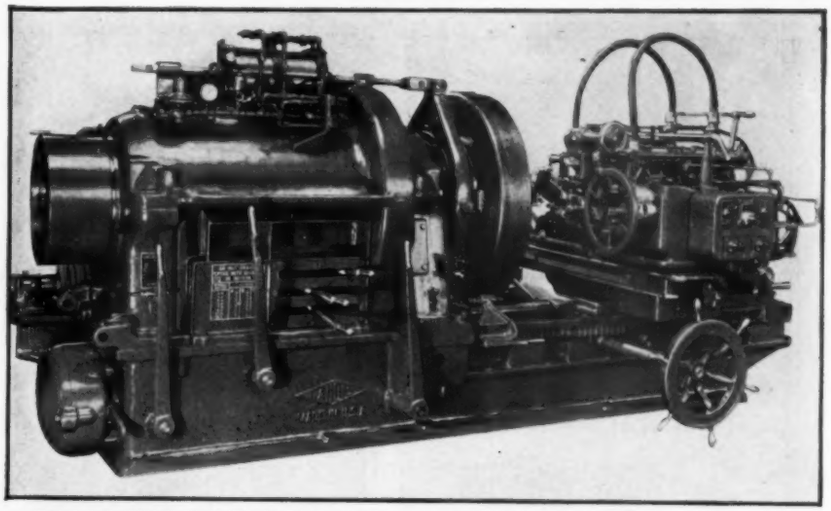


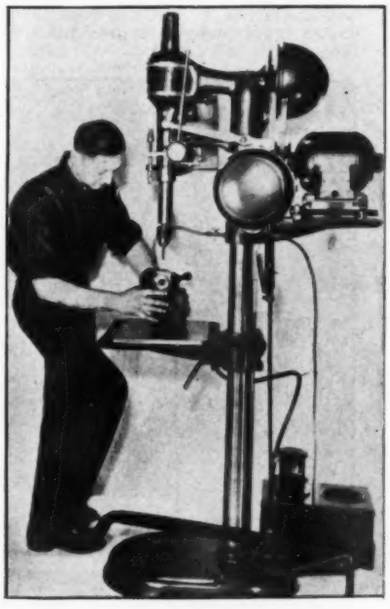
PLATE PLANER—*Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia, Pa.* Planing, straight scarfing and truing up of plate can be performed at high speed with this planer which handles plates totalling 9½ in. in thickness up to 40 ft. long. Cuts ⅛ in. deep and 1½ in. wide are taken at a speed of 45 ft. per min. Plates are held in place on the bed by 27 hydraulic cylinders which exert a total clamping force of 270,000 lb. Double tooling improves speed and accuracy. Vol. 85, p. 364.

VERTICAL CONTOUR MILLER—*Le Maire Tool & Mfg. Co., 2657 S. Telegraph Road, Dearborn, Mich.* The "Multa-Miller" vertical contour milling machine has longitudinal feed rate from 0 to 12 in. per min. Maximum cutter movement with stationary table is 2 in. crosswise and 5 in. longitudinally. With indexing table these movements are reduced to 1¼ and 3 in. Vol. 85, p. 198.

SHAPER—*Machinery Manufacturing Co., 1915 51st St., Vernon, Los Angeles, Calif.* Fifty to 150 strokes per minute are available by turning a handwheel on this precision shaper. Maximum stroke is 11¼ in. Ram length is 21 in. Floor space required is 24x36 in. Vol. 85, p. 87.

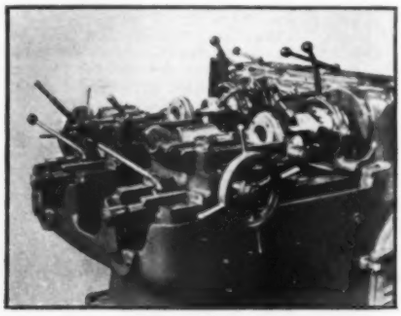


BOMB TURNING AND THREADING MACHINE—*Landis Machine Co., Waynesboro, Pa.* Tail ends of bombs can be completely finished at one chucking with this special bomb turning and threading machine. Three tool units are attached to a carriage and cross slide for turning, facing, chamfering, boring, recessing and threading operations. Leadscrew mechanism has pick-off gears for 6 to 14 threads per inch. Vol. 85, p. 314.

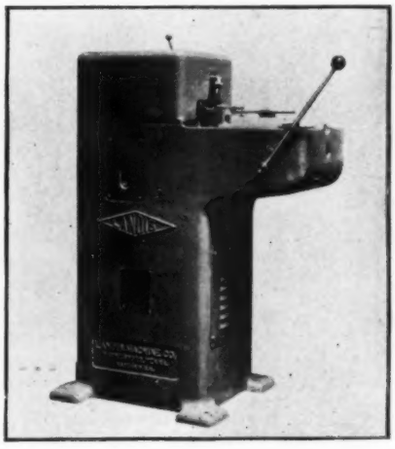


TAPPING MACHINE—*Cleveland Tapping Machine Co., 1725 Superior Ave., Cleveland, Ohio.* The Model C machine taps holes of different depths in ¼ to ½ in. steel without changing the stop gage. Pedal control frees operator's hands for handling work. Four spindle speeds range from 260 to 820 r.p.m. Vol. 85, p. 264.

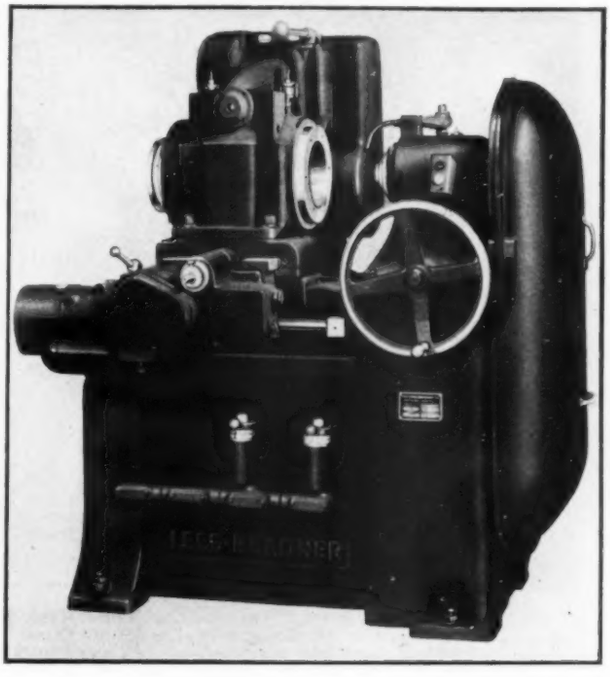
THREAD MILLER—*Murchey Machine & Tool Co., Detroit, Mich.* The milling hob is revolved eccentrically about the work while being rotated on its own axis in the No. 32 thread milling machine for mass production of right- or left-hand internal or external threads, from 1 in. to 4 in. diameter and 3 in. in length. Vol. 85, p. 831.



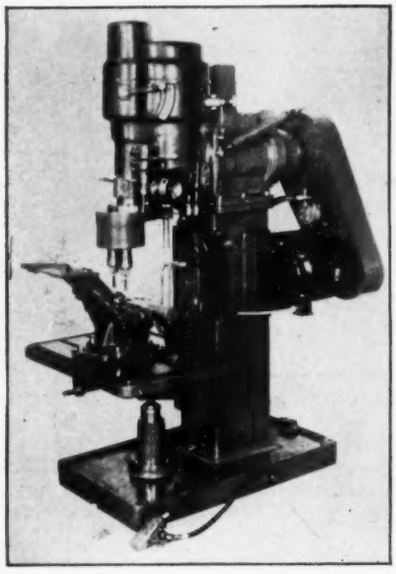
SHELL TAPPER—*Landis Machine Co., Waynesboro, Pa.* The "Landmaco" HO leadscrew-type shell tapper employs a collapsible tap instead for the usual die head. A special work-holding device supports the shell parts. This unit is adjustable for work within the range of 60- and 81-mm. motar shell. Vol. 85, p. 186.



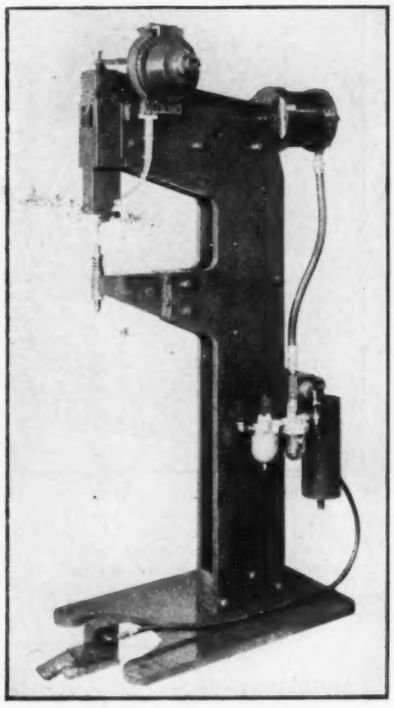
AUTOMATIC THREAD MILLER — *Lees-Bradner Co., 6210 Carnegie Ave., Cleveland, Ohio.* Model 40 automatic-chuck thread miller threads exterior diameter up to 9 in. minus diameter of cutter. Interior diameters of 4 in. plus diameter of cutter can be milled. Workhead adjusts for small taper inaccuracies in the cutter. Cutter speeds are 300 and 450 r.p.m. Vol. 85, p. 937.



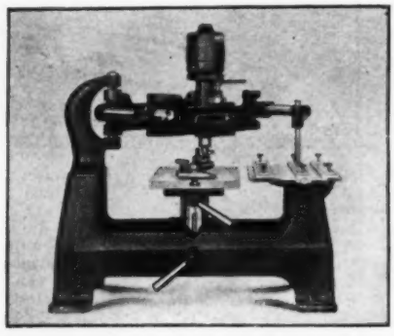
THREADING MACHINE — *Landis Machine Co., Waynesboro, Pa.* Precision threads on aircraft and automotive parts can be produced rapidly by the ⅜-in. threading machine. Single lever gives operator complete freedom of one hand for loading and unloading work. Vol. 85, p. 896.



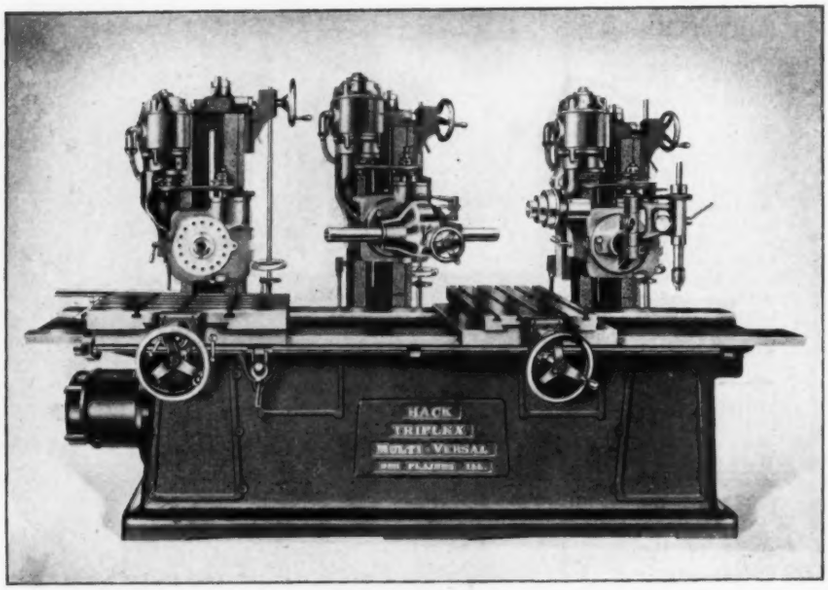
NUT TAPPER—*L. J. Kaufman Mfg. Co., Manitowoc, Wis.* The No. 10-A "Hi-Duty" tapping machine with "Hi-lo" gearing and two-spindle head threads nuts fed from a semi-automatic magazine. Twelve speeds are provided. Vol. 85, p. 359.



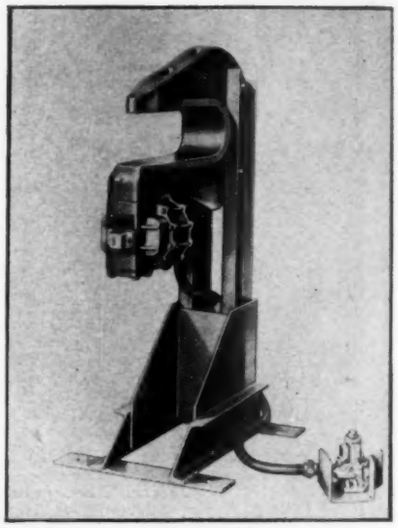
RIVITOR—*Tomkins-Johnson Co., Jackson, Mich.* This Rivitor sets aluminum alloy rivets up to ¼ in. in diameter and ¾ in. in length. Pressure is furnished by a 6-in. air cylinder operating through a toggle mechanism. Twelve throat depths from 9 to 36 in. are available. Ram stroke is 3 in. Vol. 85, p. 1072.



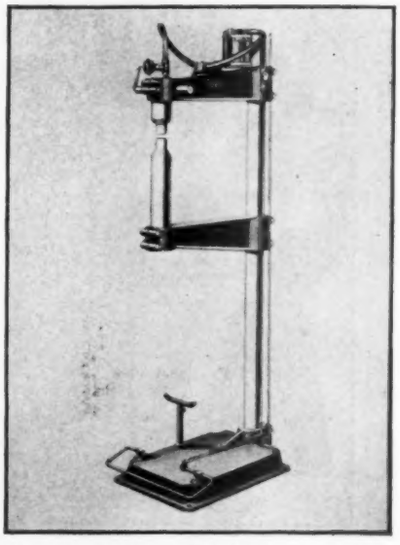
← ENGRAVER AND ETCHER—*H. P. Preis Engraving Machine Co.*, 157 *Summit St., Newark, N. J.* Combination bench-type pantographic machine has separate interchangeable heads for general industrial engraving on all materials and electric etching on soft or hardened steel. Vol. 85, p. 316.



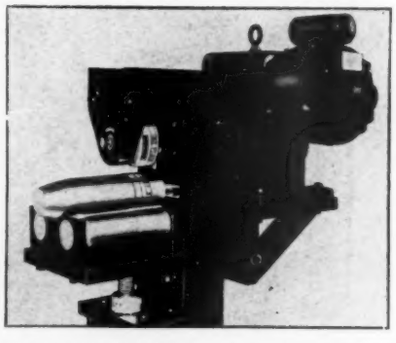
"MULTI-VERSAL" TOOLROOM MACHINES—*Hack Machine Co.*, 1228 *Harding Ave., Des Plaines, Ill.* Duplex and triplex "Multi-Versal" toolroom machines are designed to perform a sequence of operations such as milling, boring, drilling and slotting without removal of work from the table. Vol. 85, p. 896.



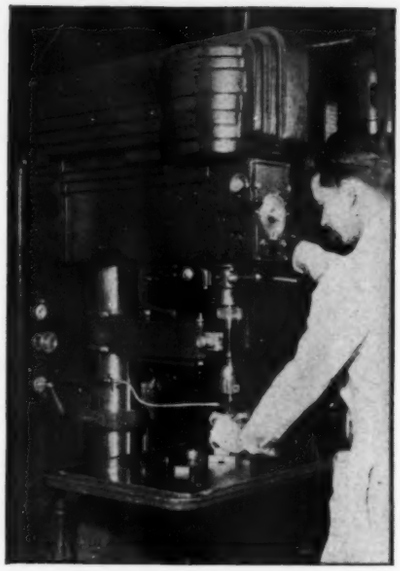
PNEUMATIC RIVETER—*Hanna Engineering Works*, 1765 *Elston Ave., Chicago, Ill.* With a force of 10 tons on the rivet exerted at 80 lb. air pressure, the stationary pneumatic squeeze riviter developed especially for riveting aircraft sub-assemblies is recommended for driving ¼-in. diameter aluminum alloy rivets. Vol. 85, p. 136.



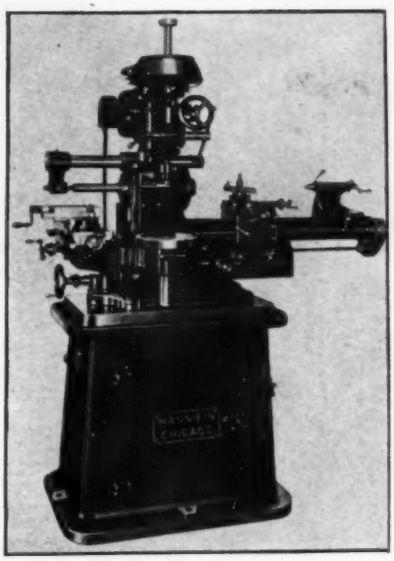
PLANISHING HAMMER — *Seiden Pneumatic Tool Co.*, 42 *Barrett St., Jackson, Mich.* With hammer and die support brackets that can be raised and lowered, the Model SFH 18–12 planishing hammer has speeds from 4 to 8,000 oscilations per minute. Stroke adjusts from a feather touch to a blow heavy enough to shape 18-gage steel. Vol. 85, p. 190.



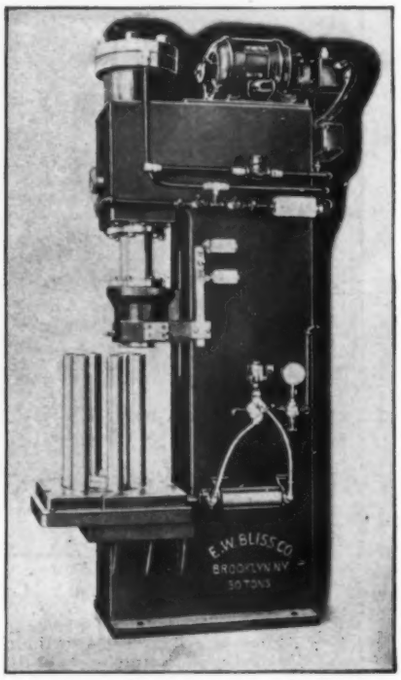
SHELL MARKER—*M. E. Cunningham Co.*, 115–117 *East Carson St., Pittsburgh, Pa.* Model No. 1 motor-driven shell marker is made in either pedestal or bench models. Vol. 85, p. 732.



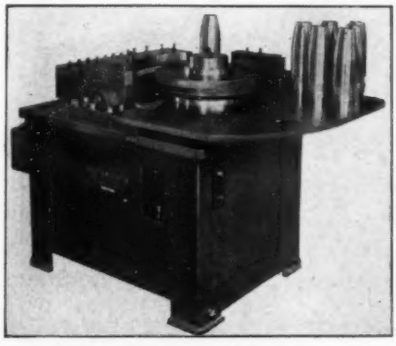
TAPPING MACHINE—*Bakewell Mfg. Co., 2427 E. 14th St., Los Angeles, Calif.* This machine will tap the softest plastics or the hardest steels. Complete automatic cycle is provided on the No. 1 unit so 20 complete cycles per minute can be performed continuously. Spindle speed is 900 r.p.m. when tapping and 1,800 r.p.m. for return. Vol. 85, p. 134.



MULTI-PURPOSE TOOLROOM MACHINE—*Hannifin Mfg. Co., 621–631 S. Kolmar Ave., Chicago, Ill.* A thread-cutting lathe has been added to the No. 10 toolroom machine. Other devices include a drill press, a horizontal and vertical milling machine. Vol. 85, p. 266.



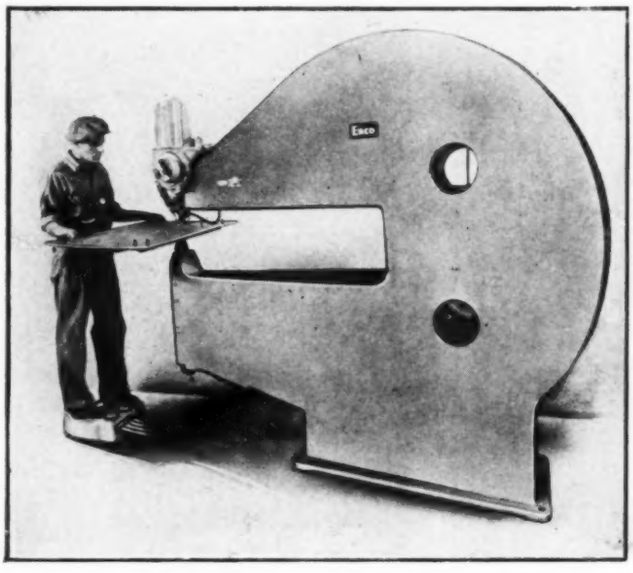
HYDRAULIC MARKING PRESS—*E. W. Bliss Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.* A high speed hydraulic marking press equipped with continuous dial feed has 30-ton capacity and 12-in. stroke. Pressure can be adjusted with accuracy to as low as 3 tons and the stroke to as low as 1 in. Vol. 85, p. 625.



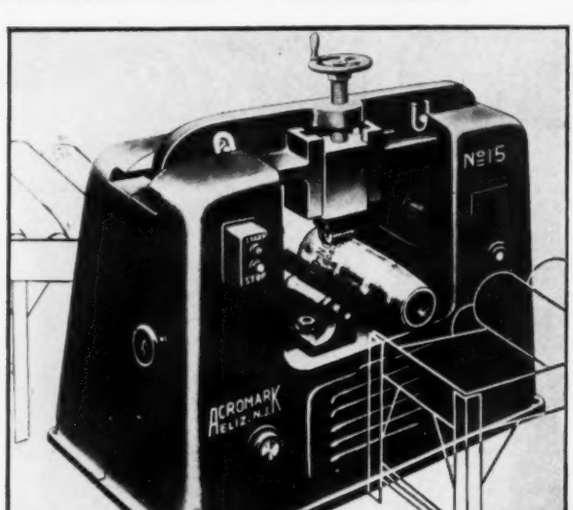
MARKING MACHINE—*Noble & Westbrook Mfg. Co., East Hartford, Conn.* Inscription is marked permanently into the periphery of high explosive shell at the same time shell band seat is knurled by this machine. Vol. 85, p. 1348.

"RIVITOR"—*Tomkins-Johnson Co., 617 North Mechanic St., Jackson, Mich.* Solid unannealed steel rivets of the "coopers," "tinners," or flat-head type up to 0.140 in. diameter can be handled on the "RK" rivet-pierce Rivitor. Maximum total work thickness is 0.075 in. for this size rivet. Throat depth is 8, 12, or 14 in. Ram stroke is 3 in. Vol. 85, p. 727.

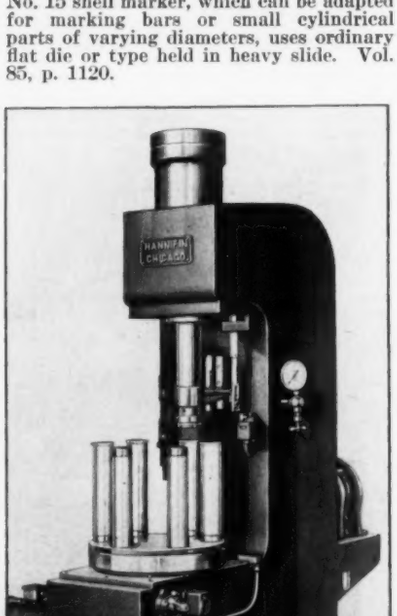
AUTOMATIC RIVETER—*Engineering & Research Corp., Riverdale, Md.* This 48-in. throat automatic C-frame punching and riveting machine requires no previous drilling, reaming, counter-sinking or matching of holes. It can handle rivets up to 3/16 in. diameter. Vol. 85, p. 1120.



MACHINE TOOLS—Miscellaneous



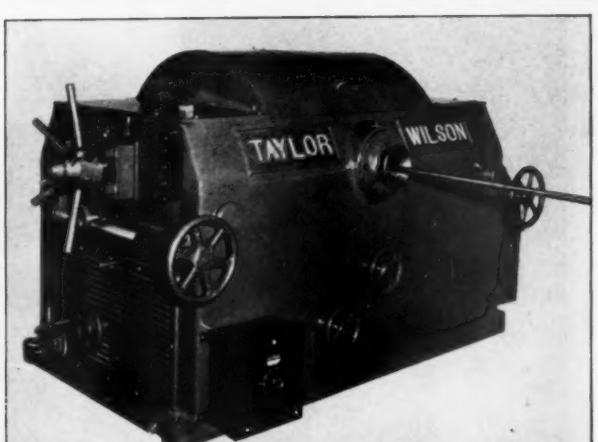
SHELL MARKER—*Acromark Corp., 251 N. Broad St., Elizabeth, N. J.* The No. 15 shell marker, which can be adapted for marking bars or small cylindrical parts of varying diameters, uses ordinary flat die or type held in heavy slide. Vol. 85, p. 1120.



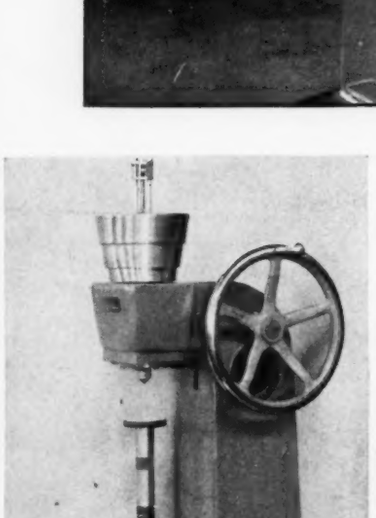
MARKING PRESS—*Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago, Ill.* The 20-ton hydraulic press illustrated marks 75-mm. shell cases and is also suitable for many other types of pressing operations. The press is a self-contained unit which operates with a rapid automatic cycle of approximately 4 sec. A 10-ton model is also available. Vol. 85, p. 92.

→

BRINNELL HARDNESS TESTER—*Riehle Testing Machine Div., American Machine & Metals, Inc., East Moline, Ill.* This hand operated hydraulic brinnell hardness tester is equipped for standard loads of 500, 1,000 and 3,000 kg. Vol. 85, p. 1019.

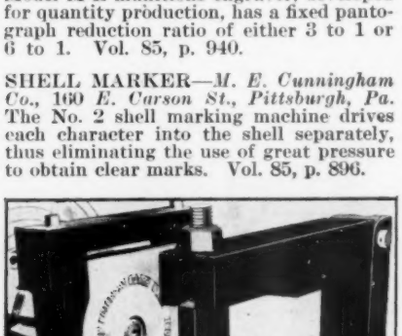


STRAIGHTENING, SIZING AND BURNISHING MACHINE—*Taylor-Wilson Mfg. Co., McKees Rocks, Pa.* This cross-roll type machine straightens, sizes and burnishes tubular and bar stock from 1/16 to 3 in. diameter to tolerances as close as 0.002 in. at speeds up to 300 ft. per min. Vol. 85, p. 266.



MUNITIONS ENGRAVER — *George Gorton Machine Co., Racine, Wis.* The Model M-E munitions engraver, developed for quantity production, has a fixed pantograph reduction ratio of either 3 to 1 or 6 to 1. Vol. 85, p. 940.

SHELL MARKER—*M. E. Cunningham Co., 160 E. Carson St., Pittsburgh, Pa.* The No. 2 shell marking machine drives each character into the shell separately, thus eliminating the use of great pressure to obtain clear marks. Vol. 85, p. 896.



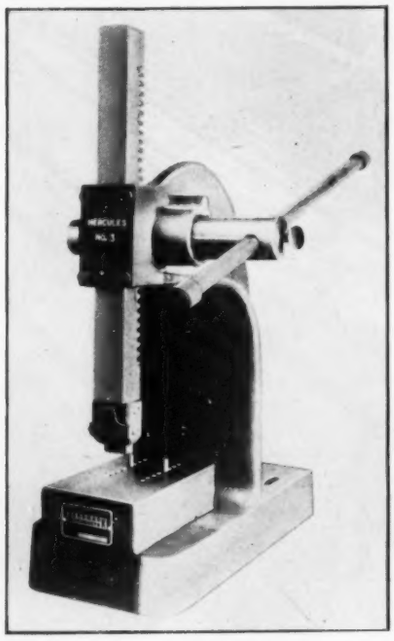
Milwaukee Model K Vertical Milling Machine

Tools That Put More Production Minutes Into the Hour.

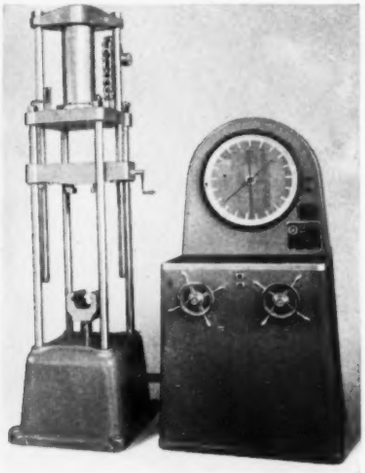
KEARNEY & TRECKER CORP., MILWAUKEE, WIS., U. S. A.

KEARNEY & TRECKER CORPORATION
Milwaukee
MILLING MACHINES

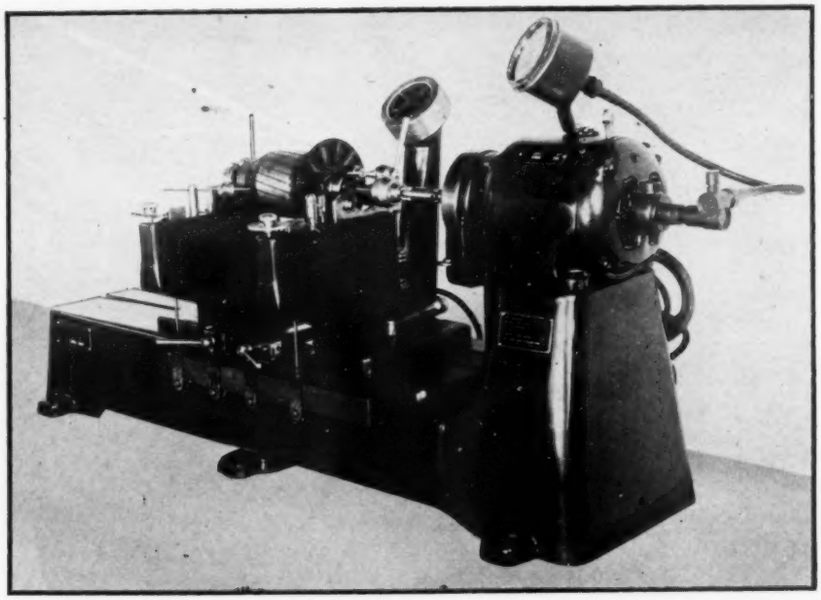
Milwaukee MILLING MACHINES



MARKING PRESS—*Acromark Corp., 245 N. Broad St., Elizabeth, N. J.* Large name plates and dies can be used on the "Hercules" No. 3 arbor press stamping block, which is detachable so that operations other than lettering may be performed. Vol. 85, p. 948.



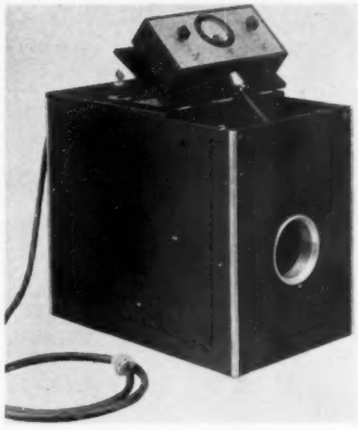
SPECTOGRAPH TESTERS—*Harry W. Dietert Co., 9330 Roselawn Ave., Detroit, Mich.* A wide range of spectro analyses can be performed with the Arl-Dietert spectograph arranged with three electric source cabinets—35,000 volt spark cabinet, 5,000 volt a.c. arc cabinet, and 220 volt d.c. arc unit. Nine samples can be recorded on one film strip. Vol. 85, p. 1020.



DYNAMIC BALANCING MACHINE—*Globe Tool & Engineering Co., Dayton, Ohio.* Condition of unbalance and required corrections for rotating parts ranging from 5 to 50 lb. in weight can be determined in 30 seconds on the NE-2 dynamic balancing machine at speeds from 0 to 5,000 r.p.m. Shaft diameters from ⅜ to 1⅜ in. Vol. 85, p. 938.

DEMAGNETIZER—*Magnetic Analysis Corp., 42–44 Twelfth Street, Long Island City, N. Y.* Steel products, susceptible to magnetization, can be demagnetized with this unit, which has a combination a.c.-d.c. coil capable of taking material up to 3 in. in diameter. Vol. 85, p. 1019.

TESTING MACHINE—*Baldwin Southwark Div., Baldwin Locomotive Works, Paschall Station, Philadelphia, Pa.* The Model 20–35 Southwark-Tate-Emery testing machine of 20,000 lb. capacity is designed for plastics, while the Model 60–35, with 60,000-lb. capacity is built for rapid testing of metals. Vol. 85, p. 1020.



TESTING MACHINE—*Riehle Testing Machine Div., American Machine & Metals, Inc., East Moline, Ill.* This 60,000 lb. universal screwpower testing machine with variable speed drive and pendulum load indicator has five load ranges of 0 to 3,000, 6,000, 15,000, 30,000 and 60,000 lb. Vol. 85, p. 1019.

AT MONARCH we work under these flags for VICTORY

AUTOMATIC LUBRICATION

CONCEIVED BY THE *Phantom Gear*

THE AUTOMATIC lubrication system used on Monarch Lathes provides the positive protection required for today's production schedules where lathes must operate for long periods at high speeds.

Through this system, the correct amount of filtered oil is automatically supplied by forced pump pressure to the carriage, to the compound rest bottom slide, and to all apron parts, including the apron half nuts. The headstock spindle bearings are pump lubricated while other vital parts are spray or splash lubricated.

Thus Monarch Lathes are always adequately protected against the lost man-hours, down time and damaged mechanisms caused by faulty lubrication.

★ ★ ★

Automatic lubrication is typical of the many developments which add to the utility, productivity and continued accuracy of Monarch Lathes. Like other important improvements it came from our constant effort to improve lathe quality and usefulness. We at Monarch call this spirit "*The Phantom Gear.*" Its energizing force now inspires us to maximum production with no letdown in quality, so important in the building of the many implements of VICTORY.

THE MONARCH MACHINE TOOL COMPANY · · · SIDNEY · OHIO

Monarch's March of Progress

No other builder has contributed so many important lathe improvements as has Monarch. For instance:

Automatic force feed lubrication

Helical geared headstock

Anti-friction bearings for all rotating parts

Flanged spindle nose

Anti-friction bearing taper attachment

Flame-Hardened beds

Automatic sizing for all size lathes

Improved accuracy, faster production with less effort, and a wider use of lathes have resulted from these important improvements. For newest lathe developments, keep in touch with Monarch.

MONARCH LATHES

COVER THE TURNING FIELD

AIRCRAFT INDUSTRY

Splitting "Tenths" in Aircraft Engine Manufacture

From the Arter file of interesting grinding jobs . . . well and profitably done.

IN every phase of aircraft engine building, accuracy is tremendously important. In grinding especially, tolerances called for are extremely close. The illustration shows one of the many installations of Arter Rotary Surface Grinders at the Wright Aeronautical Corp., Paterson, N. J. The job illustrated is the grinding of surfaces at the top and bottom of a crank case section. A flange diameter and a radius are ground at the same setting, using the side of the wheel and special micrometer stops. Arters at Wright are of various sizes (ranging in diametrical capacity from 8″ to 30″. Jobs handled are thrust washers, gear sides, connecting rod flange faces and hubs, and various other parts requiring parallel grinding to a high degree of precision and finish. The solid, well-proportioned construction of Arter Grinders, the precision of every spindle, bearing and way, make it possible to split "ten thousandths" in routine production operations.

ARTER GRINDING MACHINE CO.

15 SAGAMORE ROAD, WORCESTER, MASS.

Fast Production Needs Correctly Ground Tools!

Grind them on a

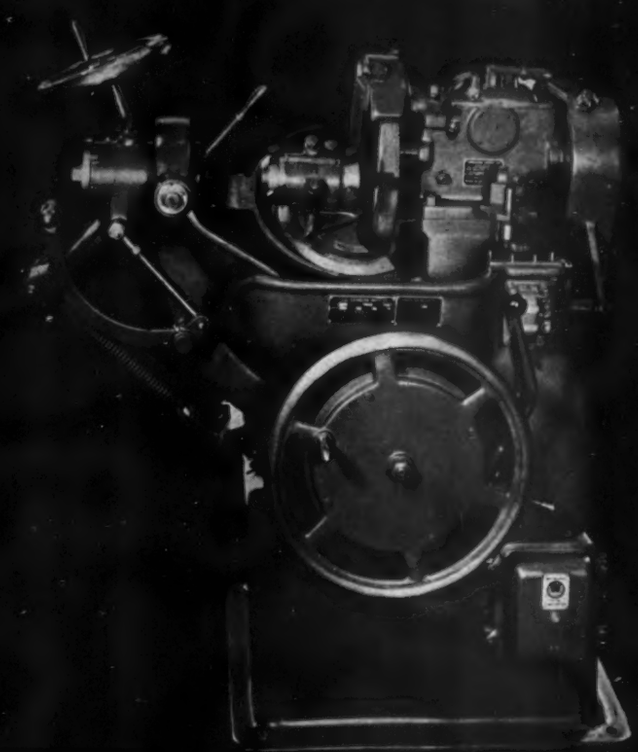
SELLERS TOOL GRINDER!

More vital than ever before is the need for correctly ground tools and tool bits — for it is only when tools are properly shaped and have the right clearance and rake that they can take heavier cuts at higher speeds for fast production work. Sellers Tool Grinders provide a simple and efficient means of accurately producing correct tool shapes and of *duplicating these shapes on any number of tools.*

To keep in step with today's production demands, you need a Sellers Tool Grinder in your plant.

Write for the new Sellers 4-T Tool Grinder Bulletin

WILLIAM SELLERS & CO., Incorporated
1610 Hamilton St. **Philadelphia, Pa.**



FOUNDED SELLERS 1848

Sellers

DOING TODAY'S JOBS...

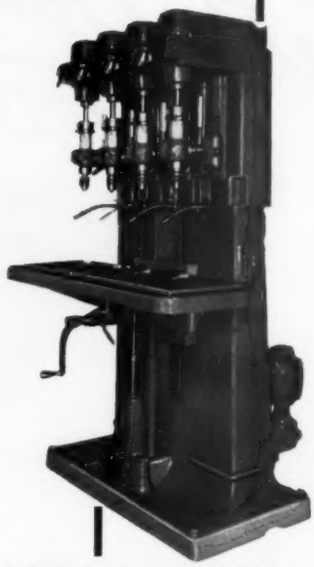
★ BETTER ★ FASTER

...AVEY'S COMPLETE LINE OF DRILLING MACHINES ARE CONTRIBUTING HEAVILY TO THE NATION'S WAR EFFORT!

In plants throughout the nation, AVEY Drilling Machines are contributing their efficient, low cost, speedy production to the national war effort. The users of AVEYS fully realize the value of these drilling machine investments . . . while taking today's jobs in their stride, they are still admirably suited for any peacetime drilling and tapping activities. AVEY Drilling Machines in 20 different types and sizes are ideal for every task within their range . . . make them *your* choice to help *you* in *your* portion of war production work!

These and most other AVEY DRILLING MACHINES, are of standard design . . . assurance that your order will receive the promptest possible delivery.

THE AVEY DRILLING MACHINE CO.
CINCINNATI OHIO

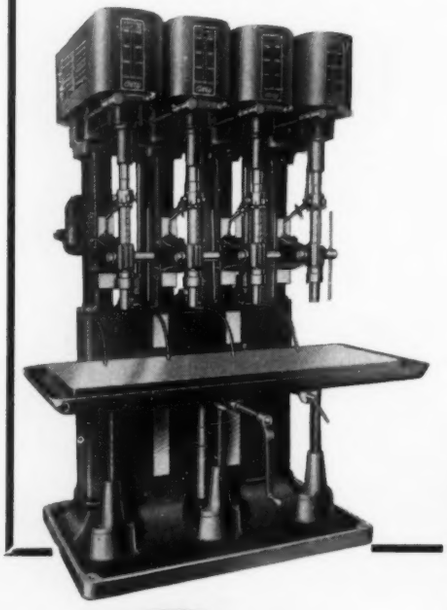


MOTOR AVEY 4 SPINDLE TYPE MA-8 STREAMLINED 8-SPEED MACHINE.

Provides range of 8 spindle speeds 1200 to 12,000 with optional lower ranges if desired. Hand feed only. Capacity from small size number drills up to 3/8" diameter in cast iron. Each spindle is driven from a vertical ball bearing mounted two speed motor through a two speed gear box and belted spindle drive.

THREE SPINDLE TYPE MA-6 AVEY DRILLING MACHINE WITH 6 SPEEDS.

Speed range 8 to 1. Two speed motor with three mechanical changes through gearing. Push button control. May be equipped with Aveymatic feed, or Reversing Motor and Control for Tapping. Built in No. 2 and No. 3 sizes.



NO. 2—4 SPINDLE BELTED AVEY QUICK SPEED CHANGE MACHINE

with individual motor drive and push button control to each spindle. Capacity No. 2 Size 7/8" in Cast Iron—9/16" in Steel.

Avey DRILLING MACHINES
CINCINNATI · OHIO

IF IT'S SURFACE GRINDING . . .

You Need ABRASIVE !

No. 3-B SPECIFICATION—This horizontal spindle, reciprocating table grinding machine with mechanical feeds handles work up to 24" long x 8" wide x 12" high under 10" wheel. Normal wheel speed 2290 rpm. Automatic longitudinal and transverse feeds. Table hand wheel automatically locked-out when power feed is in. All hand wheels located in most natural position for operator.

No. M-3—designates the No. 3-B with built-in motor on spindle. Write for Catalog

No. 34 Surface Grinding Machine
Vertical Spindle Top

No. 34 SPECIFICATIONS—A vertical spindle, reciprocating table grinding machine with automatic downfeed. It grinds work any size up to 24" long x 8" wide x 12" high. Takes 5" dia. Type 2 steel back cylinder wheel. Normal speed 3050 rpm. Write for Catalog.

ROTARY CHUCK—Individual motor driven rotating grinding attachment with 12" magnetic chuck is available for this machine. Particularly useful for accurately grinding small parts.

No. 1½ Surface Grinding Machine

No. 1½ SPECIFICATIONS—An unusual capacity—work up to 15" long x 10" wide x 12" high—features this horizontal spindle, reciprocating table hand feed grinding machine. Takes a 12" dia. wheel; normal speed 1750 rpm. More useful on many jobs than automatic machines costing twice as much. Write for Catalog.

ACCESSORIES—Motorized dust exhauster or wet grinding attachment can be furnished for either the 1½ or 3-B machines. Also available are radius and angular truing devices, plain and swivel vises, etc. Ask for information.

ABRASIVE MACHINE TOOL CO.

EAST PROVIDENCE, RHODE ISLAND, U. S. A.

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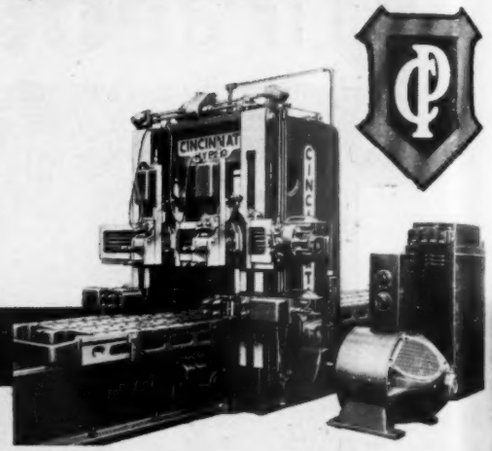
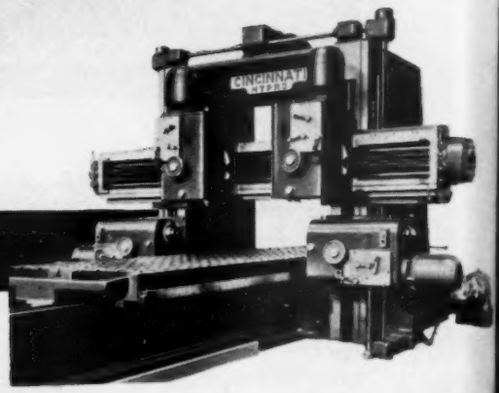
Give Your Plant Full Productive Capacity *with* CINCINNATI HYPRO TOOLS

Here's a line of sturdy, modern machine tools designed for high production with the new special alloy steel tools. Cincinnati offers a wide range of machine operations with Hypro Planers, Planer Type Millers, Combination Planers and Millers, and Vertical Boring Mills.



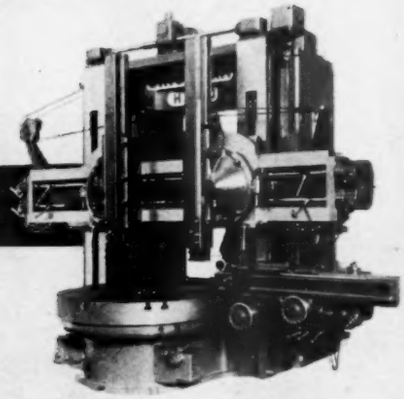
HYPRO PLANERS

Hypro Planers—These are sturdy tools designed for high production. Herringbone main drive gears assure a smooth flow of power and a balanced drive free from any loss due to side pressure. Forced feed lubrication to Vees and Inner Guides and Spray Lubrication to gear train with clean filtered oil decreases wear to a minimum. Selective Dial Feeds provide independent feed changes for Rail and Side Heads assuring ease and simplicity of operation. Rapid Traverse with patented Feed interlock mechanism provides foolproof operation and absolute safety. Table speed range from 8 ft. to 240 ft. per minute gives wide range operation.



HYPRO MILLERS

Hypro Millers—Illustrated is a 72" x 48" x 20 ft. Planer Type Miller. Built in a wide range of sizes up to 120". Massive pyramid shaped housings assure rigidity. Combination Herringbone Gear Drive to Table provides smooth transmission of power and freedom from side thrust pressures. Self contained heads have spindles powered by individual motors and mechanism lubricated by individual reversible pump. Inlaid stainless steel scales for table, housings, rail and quills facilitate accurate positioning of work and cutting tools.



VERTICAL BORING MILLS

Vertical Boring Mills—Built in several sizes from 54" to 144", providing ample range and high production of close tolerance boring and turning work. Full Timkenized Speed Box provides 16 speeds. The 6 ft. Mill shown is equipped with side head. Ram has four position turret tool holder made from solid forging. Hand feed, power feed and traverse both vertically and horizontally at operators position makes this third head very useful and easy to operate. Massive box type housings—extra heavy box type cross rail with solid narrow guide rail at bottom—Box type Rams of Meehanite are a few construction features assuring rigidity, continued accuracy and low cost production.

OPENSIDE PLANERS

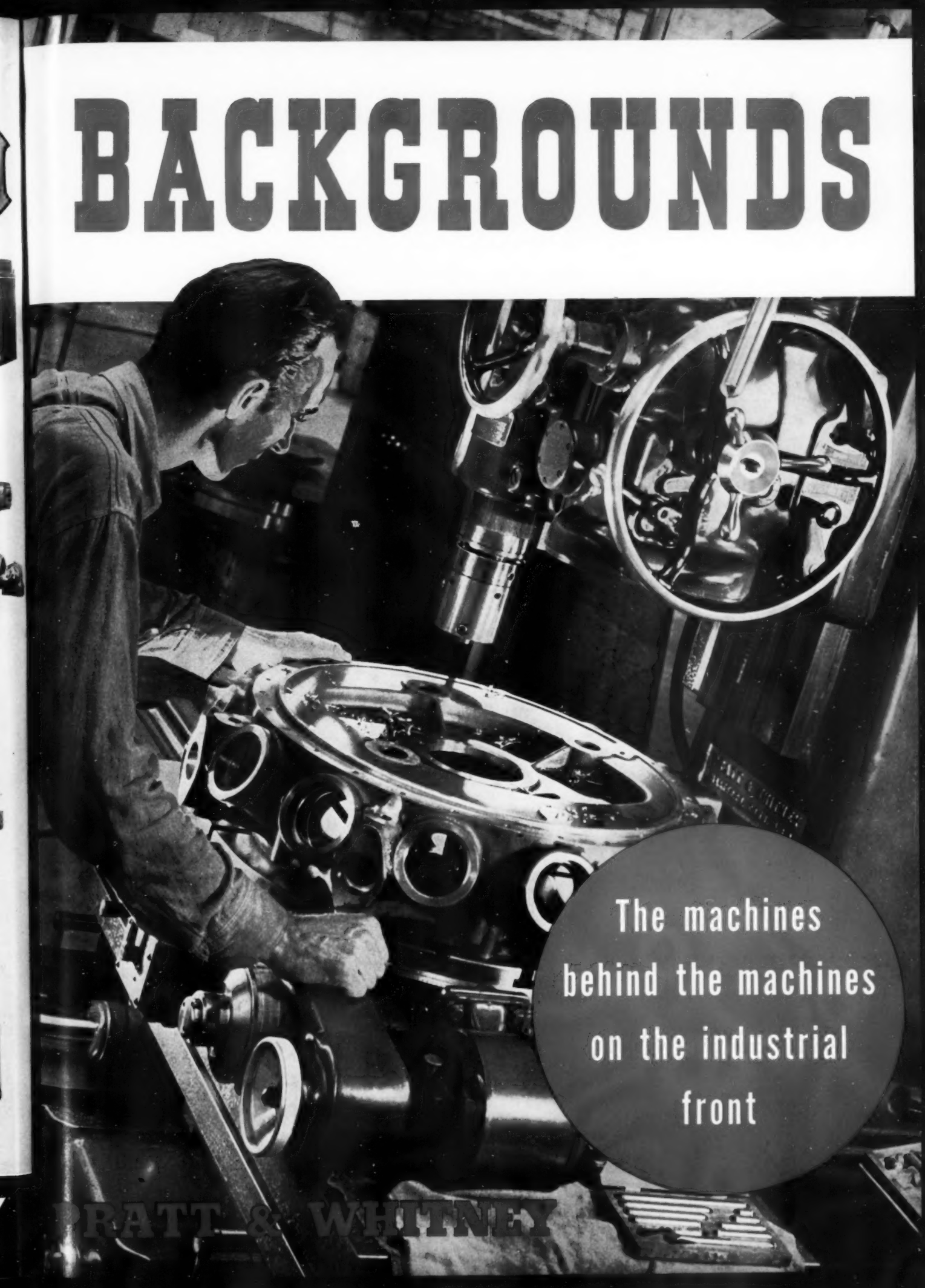
Openside Planers—Cincinnati Hypro Open Side Planers are available in sizes from 36" to 120" inclusive. Massive Pyramid Type Column with extra heavy ribs—Selective Magnetic Dial Feeds (Patented) with Power Rapid Traverse to all heads—Extended Hypro Saddle and Harp provide additional support to Slides—One Piece Construction Knee are a few of the construction features assuring utmost rigidity, accuracy of production and ease and speed of operation. Explore the time and cost saving advantages of this versatile Openside Planer.

Complete descriptive bulletins available upon request.

THE CINCINNATI PLANER COMPANY

CINCINNATI . OHIO . U.S.A.

BACKGROUNDS

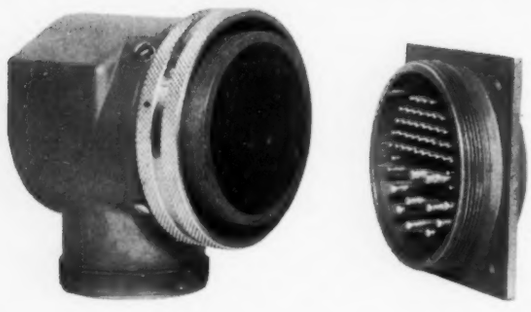


ACCURACY

THIS IS THE WING THAT JACK BUILT . . . the startling, night-marish craft that may revolutionize air transport and warfare. Without a fuselage, but retaining full maneuverability, this design increases pay loads, increases speed 25%. It's the product of 20 years of study by John K. (Jack) Northrop.

America's Background Weapon

Key to Defense Production Now and Competition to Come

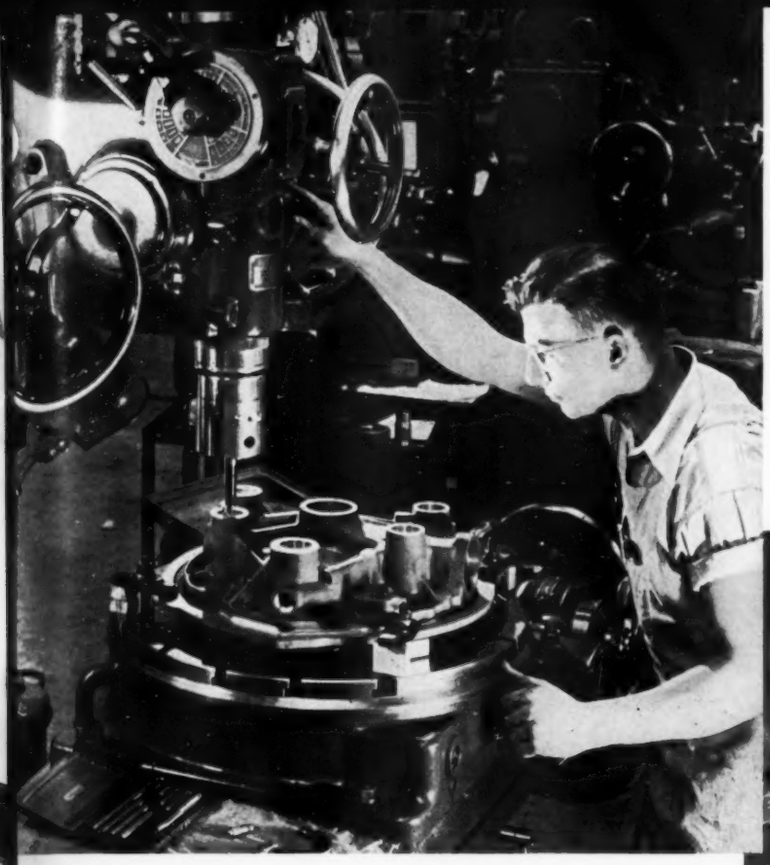


THIS IS THE PLUG *that works in the wing that Jack built . . .* a Cannon plug (Multiple-Contact Electrical Cable Connector) of the type made for Northrop, and other great plane makers, by Cannon Electric Development Co.

THIS IS THE DIE SINKER *that helps make the plug that works in the wing that Jack built . . .* a precision Pratt & Whitney machine turning out die sinking dies at Cannon. During and after the war, great changes may come to aircraft, but this machine—versatile, accurate—will always be busy paying its own way.

Div. Niles-Bement-Pond Co.

PRATT &



No Jig On This Job . . . high-speed locating of high-precision holes is easy with the P&W Jig Borer, here in use as a "jig eliminator." The most accurate machine tool in the world, it is also one of the longest-lived and most versatile. The owner of a P&W Jig Borer, so long as he sticks to precision metal working, has a useful machine in war or peace.

Boeing Trims 10 For 1 . . . gusset plates, stacked like a club sandwich, are finished to practical perfection on a P&W Vertical Shaper, a machine that will still be making money for Boeing when Hitler is chopping wood at Doorn.

Wizard of Machine Tools, the Keller Machine shown here doing a production job, turning out a cam path in tough steel from a simple sheet metal template, also serves as a die sinker, fast, accurate. Precise-to-millionths Hoke Blocks check slot width. P&W Keller Machines are being ordered now for use on the defense program *and* the peacetime changeover.

Though planes and tanks by the thousand are now in the making, America's "Victory" production program has barely got under way. *But there is no longer doubt that this "arsenal of democracy" will deliver goods of war many enough and soon enough to crush the Axis.* So American business management must now buy with an eye on *post*-war production.

In the background of the goods of war, behind the production machines on the industrial front, are basic machine tools—jig borers, Keller Machines, lathes, shapers, profilers. For these jobs, alert metal working men, considering both war and peace, are ordering Pratt & Whitney equipment. To guarantee themselves a head start in tomorrow's price-and-quality competition, they are investing in the *proved accuracy*, versatility, and long-range stamina of these P&W basic machine tools.

What Does A Salesman Do *in a seller's market?* No great secret about that in the Pratt & Whitney organization: Our sales engineers are out making their knowledge and experience serve our customers—past, present, and future—who need them. For example, a P&W man recently called at a large plant and noticed a large upright drill press with a series of sleeves, one inside another, adapting a ½" chucking reamer to a No. 4 inside taper in the spindle . . . a wobbly botch job. Our man recommended (and sold) a standard adapting sleeve . . . about $2 worth of business for P&W, worth several hundred in saved time and quality. Next time he calls, tell your troubles to our man . . . maybe he can help you.

WHITNEY

West Hartford, Connecticut

Precision Small Tools and Gages

Indispensable to *mass* production or *fine* production are the hundreds of kinds, sizes, and shapes of cutting tools and near-equal quantities of gages daily leaving Pratt & Whitney's shipping platforms. Standard items or specials for special jobs, they're *dependably* accurate. Cost reducers in time of peace, they may be life-savers in time of war.

Here is a general list:

SMALL TOOLS

TAPS
DIES
SCREW PLATES
MILLING CUTTERS
SPECIAL CUTTERS
REAMERS
PUNCHES
DRILLS

GAGES

PRECISION GAGE BLOCKS
STANDARD MEASURING MACHINES
SUPERMICROMETERS
ELECTROLIMIT COMPARATORS
CYLINDRICAL PLUG & RING GAGES
ADJUSTABLE LIMIT SNAP GAGES
THREAD PLUG & RING GAGES
ROLL THREAD SNAP GAGES
PIPE THREAD GAGES
OIL COUNTRY GAGES
RAILROAD GAGES

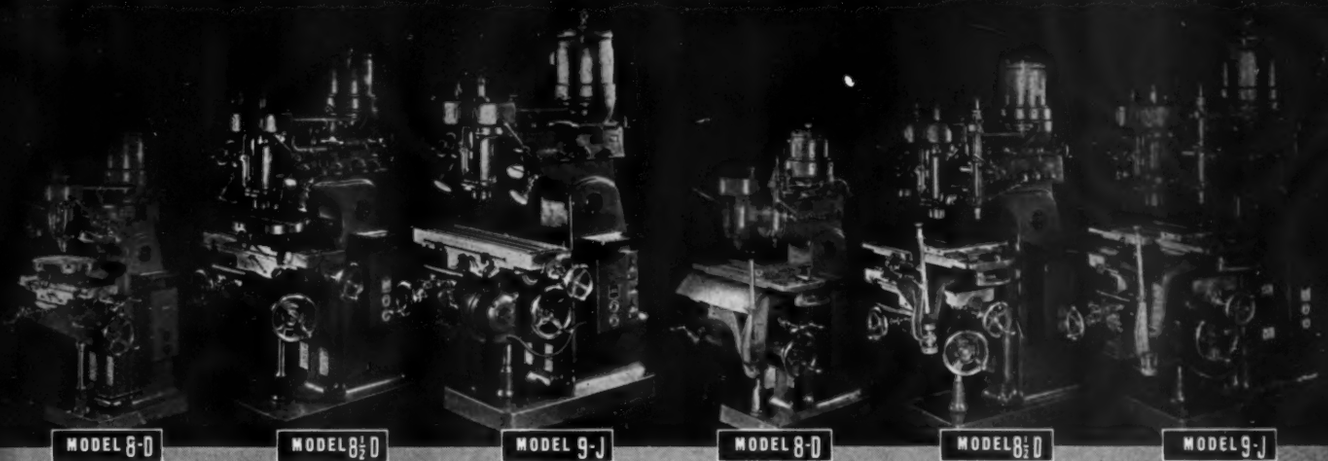
PRATT & WHITNEY

MODERN GORTON MACHINES ASSURE FUTURE ECONOMIC SAFETY

Purchase the Modern 1942 Machine Tools—needed for present emergencies—that can later be used to reduce your production costs . . . help you maintain profits in highly competitive markets.

Use George Gorton Specialized Engineering Service to assist you in the selection of the right cost-reducing equipment for die making, engraving and vertical milling. Recommendations without obligation.

Vertical Milling Machines ★ GORTON SUPER-SPEED ★ Duplicating Machines

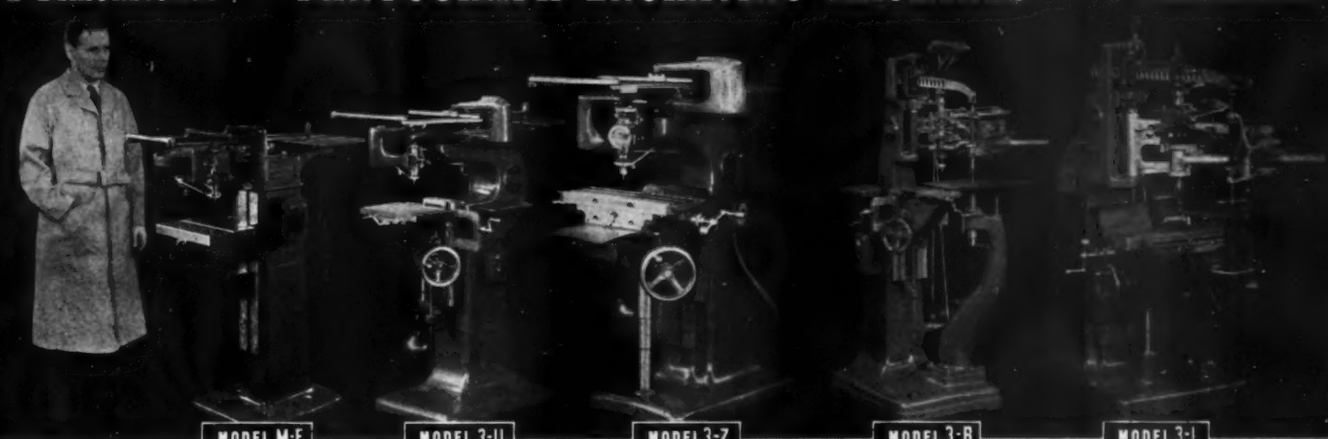


MODEL 8-D | MODEL 8½-D | MODEL 9-J | MODEL 8-D | MODEL 8½-D | MODEL 9-J

For Light Production Milling—Tool Work—and Jig Boring

For Duplicating Multiple Dies and Molds from Originals

2 Dimensional ★ PANTOGRAPH ENGRAVING MACHINES ★ 3 Dimensional

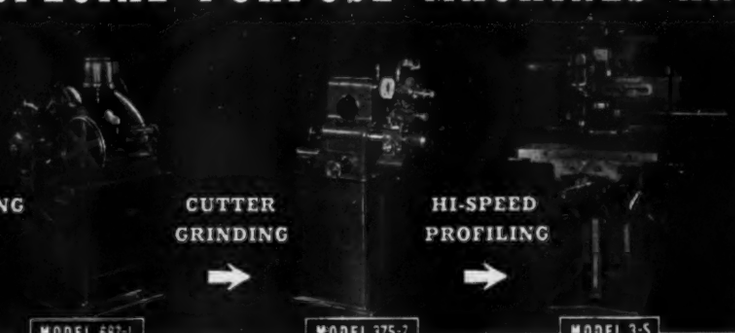


MODEL M-E | MODEL 3-U | MODEL 3-Z | MODEL 3-B | MODEL 3-L

For Engraving Letters and Designs from Templates

For Reproducing Intricate Dies from Models

SPECIAL PURPOSE MACHINES AND ACCESSORIES

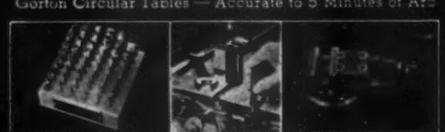


GRADUATING DIALS → MODEL 687-1

CUTTER GRINDING → MODEL 375-2

HI-SPEED PROFILING → MODEL 3-S

Gorton Circular Tables — Accurate to 5 Minutes of Arc



Cutter Sets | T-Slot Nuts | Vises & Holders

WRITE FOR FREE CATALOGS giving complete information on GORTON 1942 Machine Equipment

No. 1400-A—Super Speed Vertical Milling Machines

No. 1319-C—Die and Mold DUPLICATORS

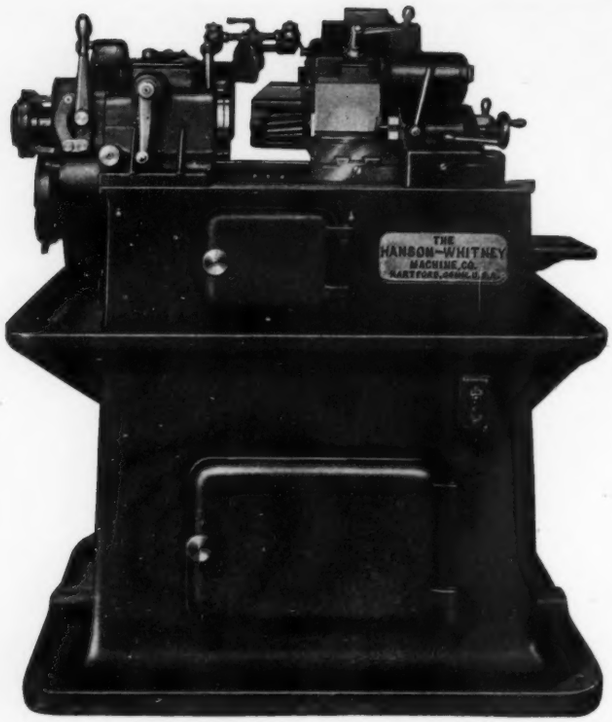
No. 1580-A—Pantograph ENGRAVING Machines

No. 1317-D—Time-Saving ACCESSORIES, Small Tools

GORTON

GEORGE GORTON MACHINE CO.

1315 RACINE STREET, RACINE, WISCONSIN, U.S.A.



Hanson-Whitney 4x9 inch Semi-Automatic Thread Milling Machine. External Capacity 4" diameter with 2" cutter; internal capacity 4" max. diameter with 2" cutter and ¾" min. diameter with ½" cutter.

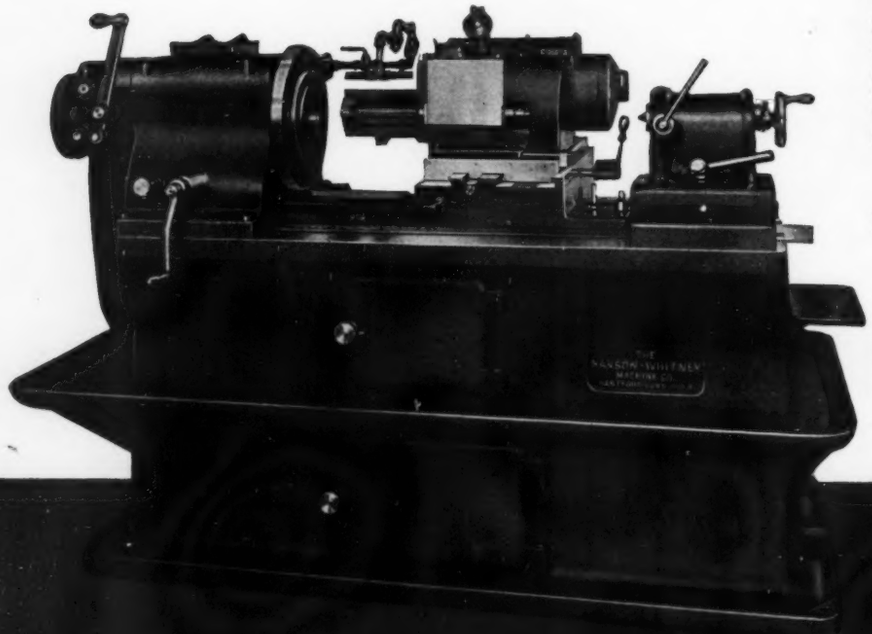
H.-W. THREAD MILLERS assure economy, speed and accuracy

These UNIVERSAL SEMI-AUTOMATIC THREAD MILLING MACHINES provide every modern facility for producing perfect threads, with the possibility of spoiled work definitely eliminated.

Ability to achieve these results is assured through application of the H-W "Milling Process" which solves the problem of threading many materials extremely difficult to machine and at the same time makes closer limits in threaded products easily attainable.

In the "Milling Process", the multiple cutter principle is applied and threads within the capacity of the machine regardless of length are finished in one revolution of the work. External and internal threads as well as taper threads can be cut, right or left hand, with equally high accuracy and convenience.

If you have a thread production problem, call on Hanson-Whitney.



Hanson-Whitney 10x24 inch Semi-Automatic Thread Milling Machine. External capacity 10" diam. with 2½" cutter; internal capacity 10" max. diameter with 2½" cutter and 1" min. diameter with 7/16" cutter.

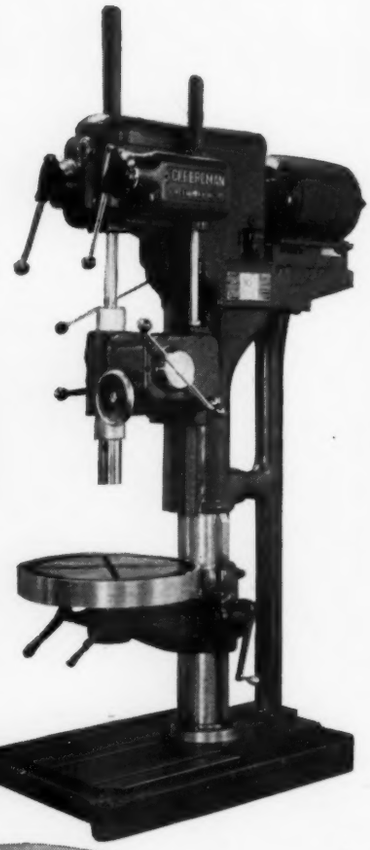
"HANSON-PROCESS" TAPS assure speed, precision and endurance

More and better threads between regrindings with H-W Taps are the direct result of careful selection of materials, scientific control of heat treating and final finishing *after hardening*. This method of manufacture — the "Hanson Process" — makes it possible to produce taps which are unvarying in correctness of pitch and form—taps of finer quality, with keener cutting edges—taps that are more durable and longer lived—taps that can be depended upon for faster, more accurate hole production.

Some of these advantages are readily apparent from close examination of H-W taps—other convincing reasons for standardizing on H-W taps quickly become evident once you try them for performance.

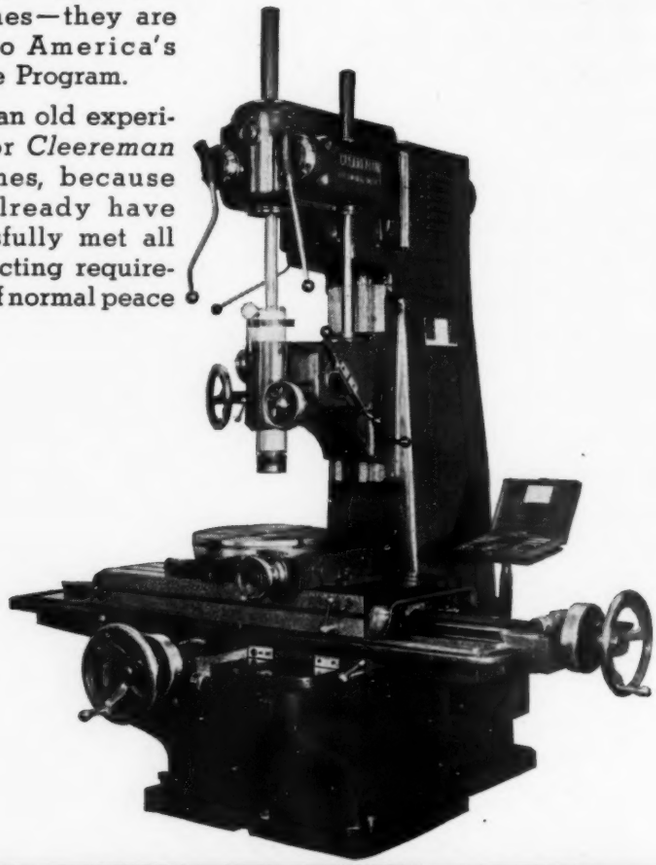
Critical Days...

"CRITICAL" *machines!*



Cleereman machines are officially designated as "critical" machines—they are vital to America's Defense Program.

This is an old experience for *Cleereman* machines, because they already have successfully met all the exacting requirements of normal peace times.



Bryant Machinery & Engineering Company
Sales Division
Cleereman Machine Tool Company
400 W. Madison St., Chicago, Ill.

CLEEREMAN

DRILLING MACHINES and JIG BORERS

TAGGED for DEFENSE

NEW

ACCURATE

HIGH SPEED

STREAMLINED

Thompson

Type-F 6" x 18"

TOOL ROOM GRINDER

WITH FULL HYDRAULIC AND MANUAL CONTROLS

A new machine in a well-known line

NATURAL VISUAL ANGLE

One of the outstanding features of this new high speed surface grinder is the inclined control panel. All controls are centralized within easy reach and in direct line of vision from the operator's natural position. This makes possible faster production and more complete control of each operation for accurate work. Also the cross feed control graduated in .0005" and the super sensitive down feed dial make it possible for average operators to do extremely accurate work at a fast rate. Write for Type "F" Bulletin. Orders taken now.

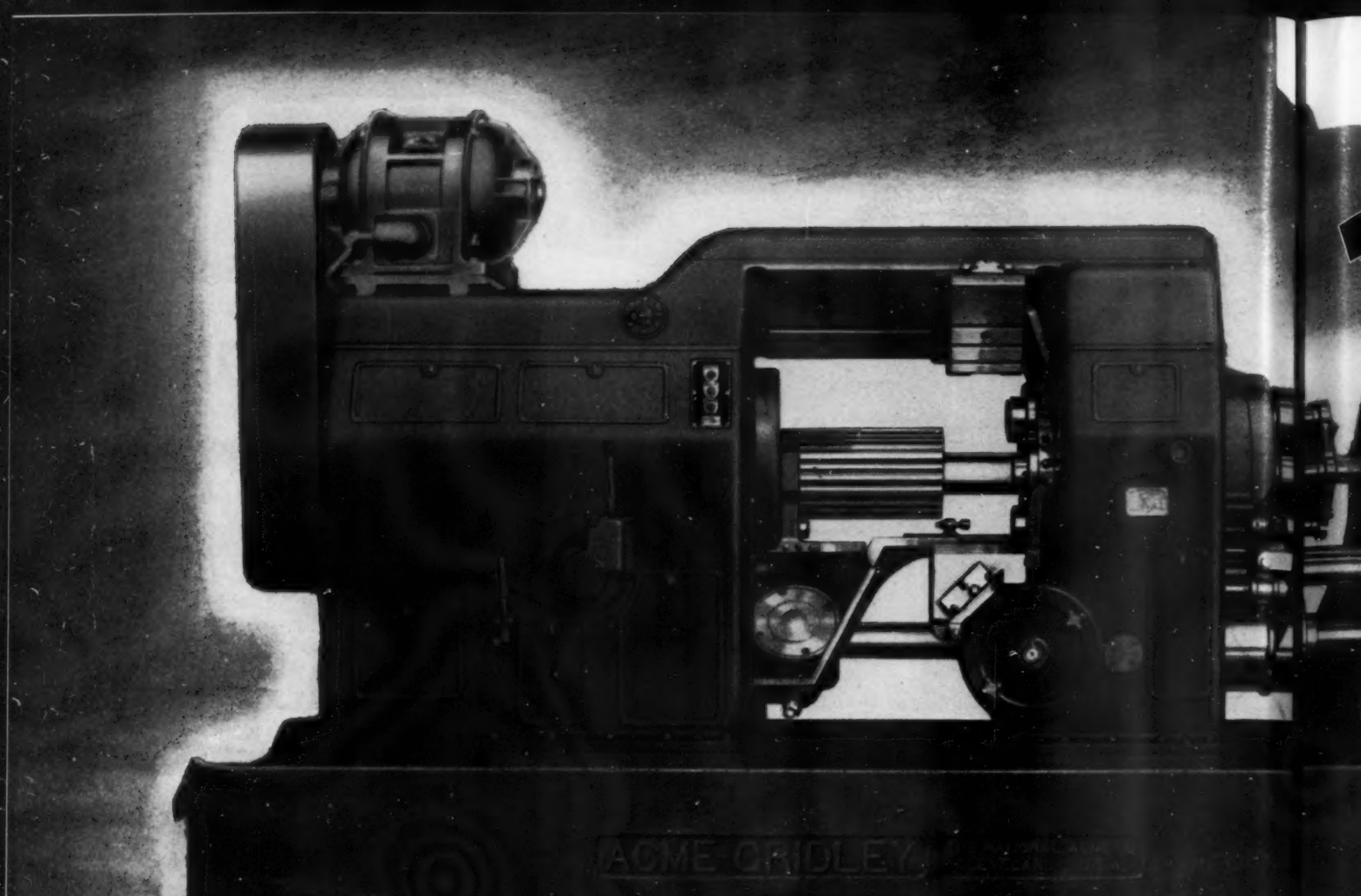
THE

Thompson

GRINDER CO.

SPRINGFIELD, OHIO

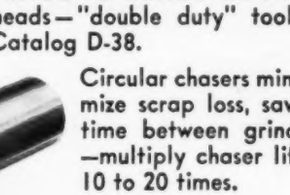
MANUFACTURERS OF --- HYDRAULIC SURFACE GRINDING MACHINES BROACH GRINDING MACHINES FULL AUTOMATIC AND HAND OPERATED MACHINE TOOL WAY GRINDERS SLOT GRINDING MACHINES SPLINE GRINDERS SPECIAL AIRCRAFT GRINDERS



POSITIVE CENTRIFUGE—for oil reconditioning, quickly pays for itself in oil saving and life of machines and tools in any production shop. Catalog P-41.

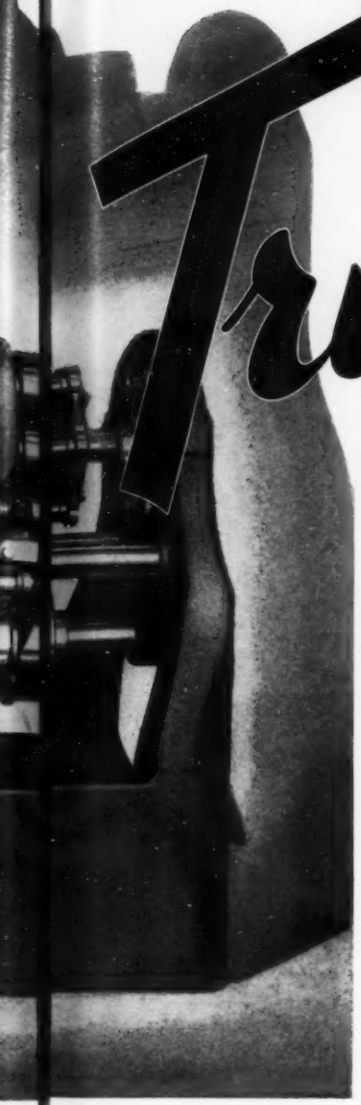
NAMCO CIRCULAR CHASER SELF OPENING DIES—for production threading. By a simple change they are converted to hollow milling heads—"double duty" tools. Catalog D-38.

Circular chasers minimize scrap loss, save time between grinds—multiply chaser life 10 to 20 times.



NAMCO COLLAPSING TAPS—quick and positive operating, will positively hold size on long run high precision jobs. Catalog D-38.

SOLENOID COUNTER—with simplified construction, dependable solenoids, working parts of hardened steel, dust proof, legible dial. Guaranteed for life of heavy duty machines at high speed on continuous production.



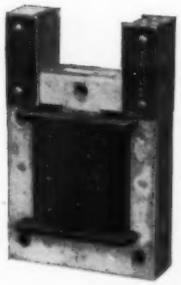
Trustworthy in Defense

Operate multiple spindle Bar or Chucking Automatics on a 24-hour Defense schedule, push them to the limit of speeds and feeds that tools will safely stand—then you find out how trustworthy they are.

Under just such gruelling conditions, in arsenals and among suppliers of billions of Defense parts, hundreds yes, thousands of Acme-Gridley automatics will continue trustworthy for "the duration" and years after—

***Because* Acme-Gridley design factors that insure accuracy and stamina were thought out and PROVED out far in advance of today's emergency needs.**

THE CHRONOLOG—prints a record showing why, when and how long any production operation is idle. Gives accumulated count of units produced. Production increases average more than 10%. Catalog No. 3707.



STELLITE-WELDED SOLENOIDS—for heavy duty requirements of machine tool manufacturers. Less weight, smaller size and higher pull at less amperage. 4 to 30 pounds at 1" stroke push or pull. Catalog EM-41.

SNAP-LOCK LIMIT SWITCH—"built with machine tool ruggedness" for all normal circuit duty, features 2 double break circuits, separate enclosures for electrical and mechanical sides. Levers to suit. Adopted by over 300 manufacturers as standard built-in switch, used by thousands of others for replacement. Free trial.

NATIONAL ACME

170 EAST 131ST STREET • CLEVELAND, O.

ACME-GRIDLEY 4-6 AND 8 SPINDLE BAR AND CHUCKING AUTOMATICS • SINGLE SPINDLE AUTOMATICS • AUTOMATIC THREADING DIES AND TAPS • SCREW MACHINE PRODUCTS • THE CHRONOLOG • LIMIT SWITCHES • POSITIVE CENTRIFUGE • CONTRACT MANUFACTURING

Step up Shell Production with the

SPARKS *Semi-Automatic* HYDRA-FEED LATHE

FAST • ACCURATE • CONVENIENT • STURDY • POWERFUL

Designed and built for speed and maintained accuracy in rough and finish turning of shell bodies, this modern, powerful, easily handled sturdy machine offers an outstanding means for saving time on rush defense work.

With a lathe battery set up for rough and finish machining of shell bodies, the shell forging is inserted in lathe and tailstock spindle traversed hydraulically to locate shell on mandrel. At this point, the spindle starts automatically through hydraulically operated clutch. Operations are then performed in the following sequence:

1st Operation—rough turning body of shell, facing bore end and cutting off to length.

2nd Operation—finish turning outside of body and finish turning nose contour to bourrelet.

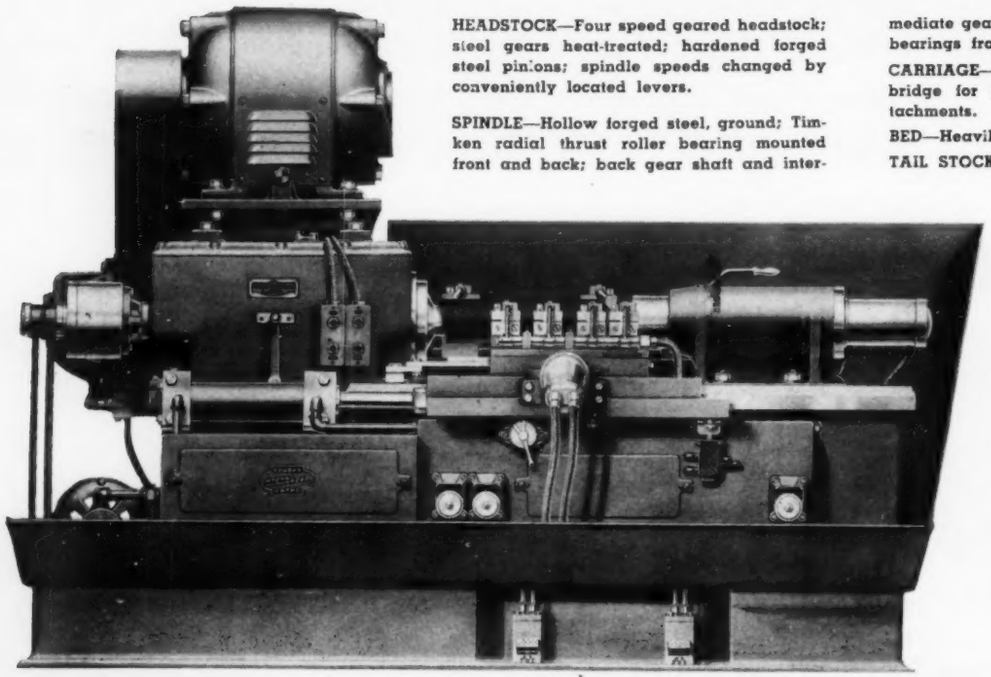
3rd Operation—boring and chamfering, reaming and chamfering; and recess.

4th Operation—finish face base and finish turn band seat.

5th Operation—machine rotating band.

On completion of these operations, spindle stops automatically, pressure is released on expanding mandrel and tailstock spindle traversed to permit quick recovery of the machined shell.

General Features



HEADSTOCK—Four speed geared headstock; steel gears heat-treated; hardened forged steel pinions; spindle speeds changed by conveniently located levers.

SPINDLE—Hollow forged steel, ground; Timken radial thrust roller bearing mounted front and back; back gear shaft and intermediate gear shaft mounted in Timken roller bearings front and rear.

CARRIAGE—Heavy ribbed design with extra bridge for supporting multiple tooling attachments.

BED—Heavily ribbed and rigid throughout.

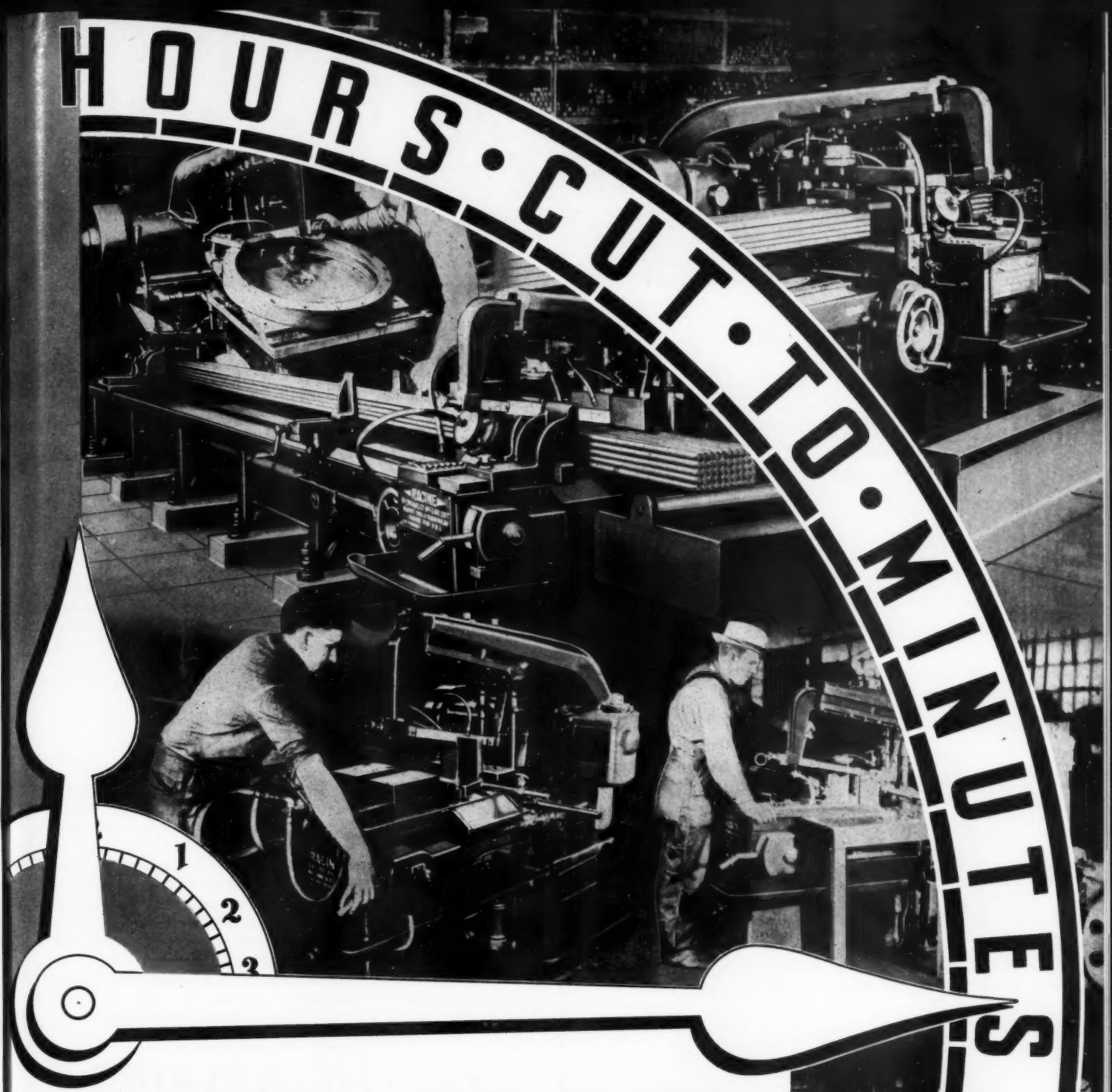
TAIL STOCK—Heavy duty; quill of special heat-treated steel, accurately ground; traverse movement of quill controlled by foot treadle valve; spindle equipped with Timken radial thrust roller bearings.

CUTTING FEEDS — Quickly changed by feed dials on front of control box; all hydraulic feeds have automatic stops, automatic reverse and rapid return traverse; spindle speeds geared to highest speeds possible when using Tungsten-Carbide tools.

Investigate Immediately

SPARKS HYDRA-FEED LATHE

SPARKS MACHINE TOOL CORPORATION
NORWALK . . . . CONN.



WITH RACINE METAL-CUTTING MACHINES

On Battleships . . . in Navy Yards . . . Arsenals . . . and especially in Heavy Industries wherever metal-cutting jobs are tough . . . Racine Saws are unequaled in cutting bars . . . billets . . . structural shapes and special alloys.

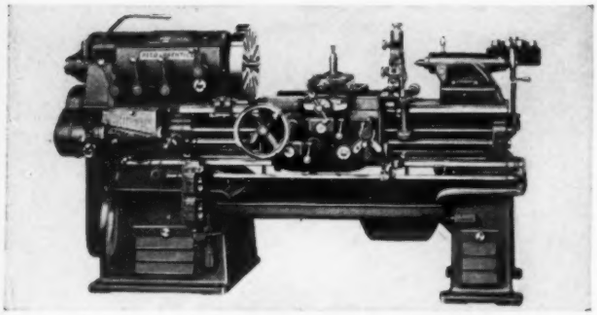
Cutting time has been improved anywhere from 100% to 400% by using Racine Hydraulic Saws. Smooth oil cushioned performance saves blades and permits faster and heavier cutting feeds.

Write for cutting time information or production estimates on any one of the modern Racine saws—a full line from 6"x6" to 14"x20" capacity for Utility—all purpose or production cutting.

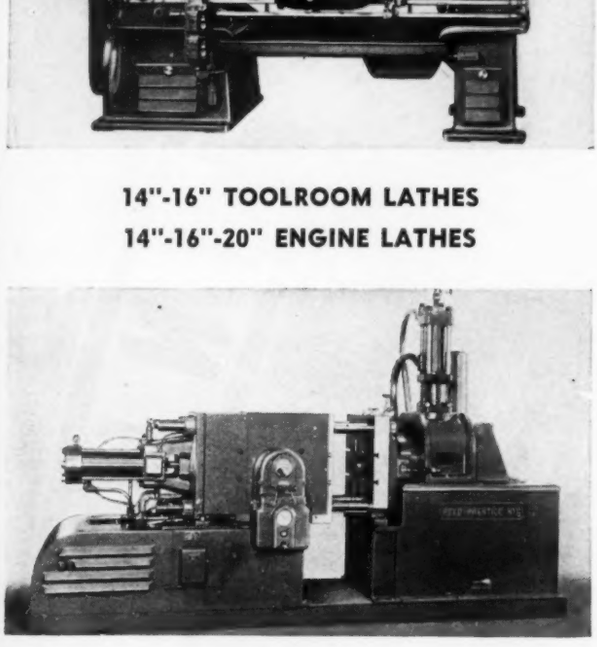
RACINE TOOL MACHINE CO.

STATE ST. ··· RACINE, WIS.

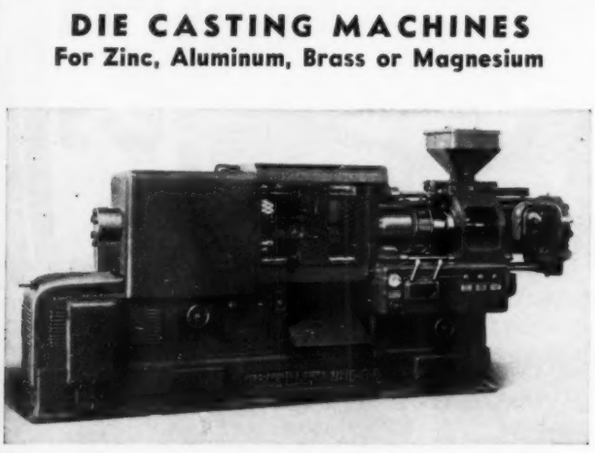
REED-PRENTICE with



14"-16" TOOLROOM LATHES
14"-16"-20" ENGINE LATHES



DIE CASTING MACHINES
For Zinc, Aluminum, Brass or Magnesium



PLASTIC MOLDING MACHINES
4-6-8 Ounce Sizes Available

. . for TURNING

Reed-Prentice Engine and Toolroom Lathes are constructed to meet rigid U. S. Navy specifications . . . with 8 or 16 spindle speeds available through accurately cut spur gears. Headstock gears operate on heat-treated multiple spline shafts, different speeds being obtained by shifting of conveniently located levers. These lathes are modern in every detail of design and construction. They are adapted for high spindle speeds, amply powered for tungsten carbide tools and can be depended on for smooth operation and high precision.

Features include 100% anti-friction headstock; nickel chromium electric furnace heat-treated steel gears, shaved, hardened and lapped; four bearing precision TIMKEN spindle mounting; spindle of chrome vanadium alloy steel, heat-treated and hardened.

DIE CASTING MACHINES

Built in the following models, both equipped with semi-automatic electric control: No. 1½ G for Aluminum, Brass, Magnesium or Zinc, Die Plates 28"x29". No. 1½ for Zinc, Tin or Lead Base Alloys, Die Plates 28"x29". Features of No. 1½ machine (shown) include full hydraulic operation controlled by two levers, interlocked so that plunger cylinder cannot be operated until dies are securely locked; safety pilot valve eliminates danger of shooting metal when dies are open; automatic ejection of castings. With the pressures available in these machines, extreme density of castings is obtained, permitting high production of many ordnance parts, heretofore considered impossible to die cast.

PLASTIC MOLDING MACHINES

Available in 4, 6 and 8-ounce capacities, equipped for full automatic operation but can be run semi-automatically. Features include: safety latch on pilot valve lever which prevents accidental starting; opening of safety door closes hydraulic circuit, opening mold automatically; hydraulic pressure used for opening and closing molds and operating injection cylinder Reed-Prentice Injection Molding Machines are top choice of leading molders, who are constantly finding new applications for plastics, thereby releasing metals vital for defense needs.

MACHINE TOOLS

REED-PRENTICE CORP.

WORCESTER MASS., U. S. A.

NEW YORK OFFICE: 75 WEST STREET

. . . OFFERS TIME SAVINGS . . . Modern Equipment

MILLING and DIE SINKING

Accuracy, ruggedness, ease of operation and speed are offered in all Reed-Prentice VERTICAL MILLERS and DIE SINKERS.

Modern in every detail of design and construction, these machines are adapted to a wide number of uses including rubber and plastic molds, dies for die casting and drop forging, glass and other materials, as well as for production work in countless variety.

The No. 5 Vertical Miller and Die Sinker is comparable in capacity to No. 4 machines of other makes. Helical gear drive to spindle, running in precision TIMKEN bearings, makes this a powerful, smooth-running, efficient machine. Additional features include: Spindle of heat treated forged chrome vanadium steel, with clutch drive nose and NMTBA taper; machine TIMKENIZED throughout; power rapid traverse in both cross and longitudinal directions; 18 spindle speeds, 17-600 RPM. This machine can be furnished with 24" or 30" maximum distance from end of spindle to table.

No. 5 JIG BORER

Versatility . . . precision . . . ease of operation—highlight the many advantages of the No. 5 Jig Borer. Leading aircraft plants, and Tool and Die Shops on vital defense work, are using this machine for extremely accurate operations on jigs and fixtures. Standard equipment with the No. 5 Jig Borer includes: Power down feed to spindle, precision measuring devices for accurate measurements to one ten-thousandth of an inch, clamps for rigidly locking table to saddle and saddle to base of machine, also 5-1 compound gearing on cross and longitudinal hand wheels. The No. 5 Jig Borers can also be furnished with 24" or 30" maximum distance from end of spindle to table.

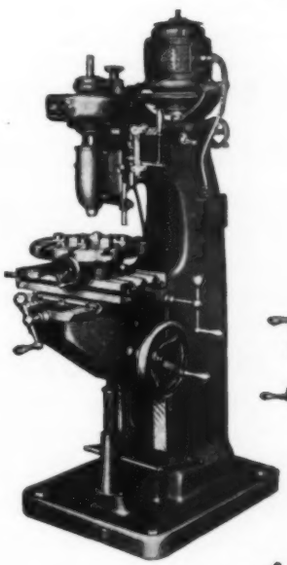
SPECIFICATION TABLE

	No. 2V	No. 3VG	No. 3VGS	No. 5	No. 5 Jig
Longitudinal Feed	16"	24"*	27"*	48"*	48"*
Cross Feed	11"	12"	20"*	16"*	16"*
Table Length	20¼"	44"	32"	68"	68"
Table Width	8⅞"	10¼"	22"	16"	16"
Head Travel		5"	5"	15"	15"
Vert. Feed of Knee	15"	18"	16"		
Net Weight (Lbs.)	1650	2850	4795	11,500	12,000

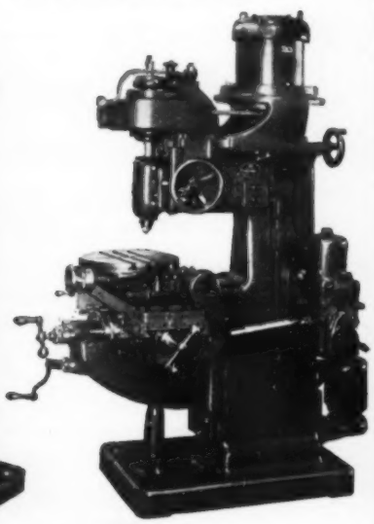
Power feeds marked (*)

Complete details on Reed-Prentice machines are available promptly on request. Outline your problem—ask our engineers to help you solve it.

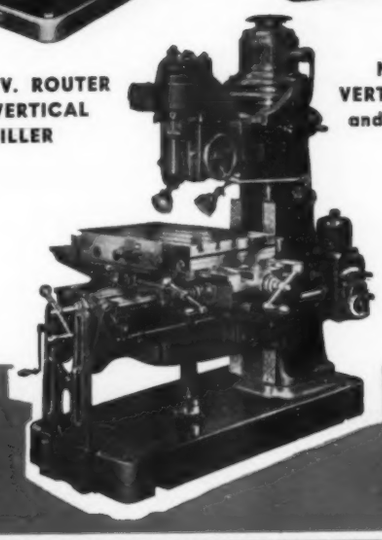
NO. 5 MILLER AND DIE SINKER
ALSO NO. 5 JIG BORER



NO. 2 V. ROUTER and VERTICAL MILLER



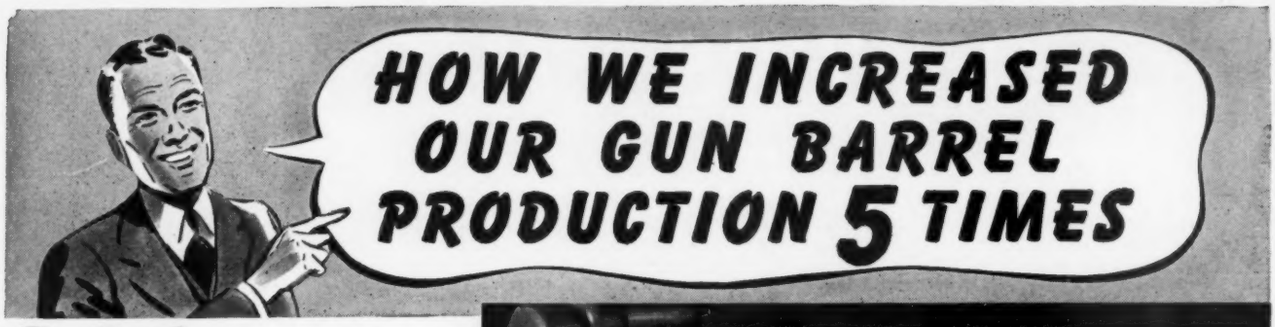
NO. 3 V G VERTICAL MILLER and DIE SINKER



NO. 3 VGS VERTICAL MILLER and DIE SINKER

REED-PRENTICE CORP.
MACHINE TOOLS
WORCESTER MASS. U. S. A.

CLEVELAND OFFICE: 1213 W. THIRD STREET



80% Savings in time on *both* Drilling and Boring of 37 mm Gun Tubes

This manufacturer (name on request) is setting a new high in gun tube production. Likewise, if you are using conventional single spindle machines, you can save both time and money with this new two-spindle machine. Study these figures:

The 420 drilling 37 m/m (1-5/16" Dia.) in gun tube 84" long. Two spindles drill from solid steel at a total penetration rate of 3.6 inches per minute — 1.8 inches per minute feed.

For Drilling and Boring Parts Like These:

Gun Tubes • Landing Gear Cylinders
Recoil Cylinders • Propeller Shafts
Hollow Spindles • Hydraulic Cylinders
Crankshafts • Camshafts • Drive Shafts • Printing Press Rolls • Axles
Connecting Rods

Non-symmetrical parts can be machined by using cradle-type fixtures.

DRILLING PRODUCTION:

Previous, 2½ hrs. per barrel, floor to floor
Present, 30 min. per barrel, floor to floor

An average of 1.8 inches feed per minute was used to obtain this production, but with TWO spindles working together, the total penetration rate is 3.6 inches per minute.

BORING PRODUCTION: (Ruff & Fin.)

Previous, 270 minutes per barrel, floor to floor.
Present, 52.5 minutes per barrel, floor to floor.

These are the floor to floor times for boring. In addition, a long guide bushing in the quill permits starting pack-bit directly into the previously drilled hole . . . no starting hole needed.

SAVES 50% IN FLOOR SPACE

Floor space required for this machine is no more than that required for a single spindle machine. Designed for deep hole and cylinder boring operations, it carries no useless gadgets.

CONSTANT FEED PER SPINDLE REVOLUTION

Spindles and hydraulic pumps are driven by the same motor. This feature insures a constant feed per revolution regardless of fluctuation in motor speed due to variance in loads. Tailstock and headstock are coupled by adjustable tie-bars on both sides. This provides a bearing surface four feet longer than part being machined . . . insures a solid footing for the tailstock.

RIFLE DRILLING, CONVENTIONAL DRILLING AND CYLINDER BORING operations are being performed successfully and economically with the 420. The difference in these and their application to this machine are fully described in the free booklet offered at the right.

DELIVERIES are better than for standard general purpose machines which are not readily adaptable to deep hole operations. We urge you to investigate the possibilities of this machine and place your order early for earlier delivery.

W. F. & JOHN BARNES
ROCKFORD ILLINOIS

5 IMPORTANT FEATURES

★ Two spindles work together . . . double production in same amount of floor space taken by single spindle machine.

★ Feeds and spindle speeds always in definite relation . . . constant feed per revolution.

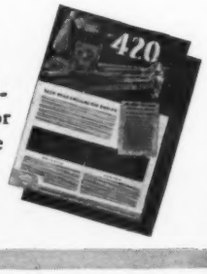
★ Massive head together with long bearing surface permits heavy feeds . . . better production.

★ Pack bit boring can be done without boring preliminary guide hole — one operation eliminated.

★ Hollow spindles permit removal of pack bit without returning through bore . . . no scratches.

5 *DEEP HOLE TOOLING SET-UPS* are illustrated in this bulletin. LINE drawings trace coolant path and illustrate cutting operations on drilling, boring, and reaming deep holes. Packed full of useful up-to-date information, this bulletin will help you simplify a tough job.

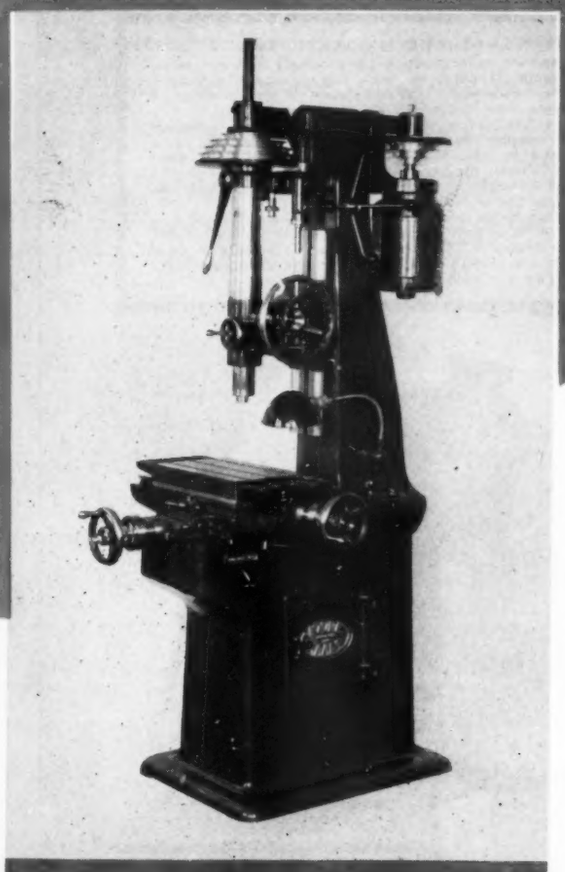
FREE!

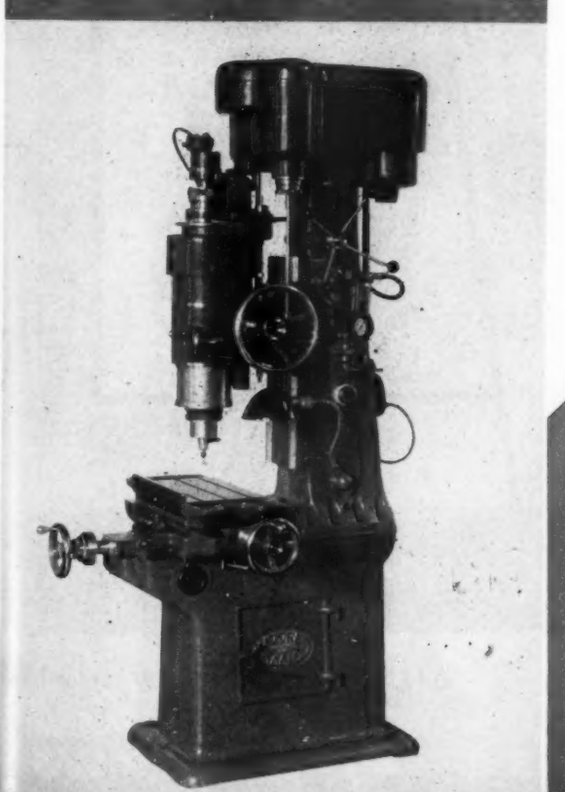


DEEP HOLE DRILLING DATA. Write for this useful deep hole drilling and boring information today. Ask for bulletin A.M. 420.

Moore JIG BORER Moore JIG GRINDER Companion Machines

indespensable to precision tool and die work...





FIRST: BORE HOLES ON A MOORE JIG BORER

The ideal machine for small and medium-sized parts. Die sections, gage bodies, master plates, jig bodies—all can be bored with maximum accuracy and convenience. Holes in parts to be hardened should be left .005" to .010" undersize for grinding.

THEN: RELOCATE AND GRIND HOLES TO SIZE ON A MOORE JIG GRINDER

The outstanding new development in toolroom equipment. Grinding of holes corrects their location, removes surface decarburization, produces a new, clean surface with excellent finish. Such conditions, heretofore impossible to attain, can now be produced with ease on the Moore Jig Grinder.

MANUFACTURED BY

THE MOORE SPECIAL TOOL CO., INC.

BRIDGEPORT, CONN

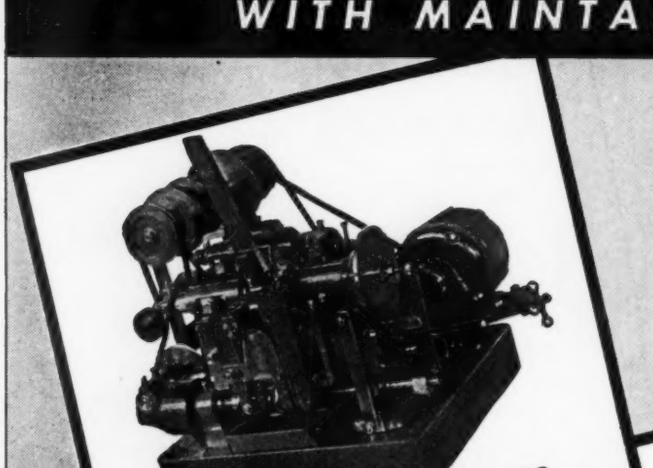
EXCLUSIVE REPRESENTATIVE

MARBURG BROTHERS, INC.

30 WEST ST., NEW YORK CITY

WALTHAM MACHINES

INSURE HIGH PRODUCTION WITH MAINTAINED ACCURACY



WITH MAGAZINE FEED AND MOTOR DRIVE

WALTHAM AUTOMATIC PINION AND GEAR CUTTERS

Any operator can produce parts quickly and accurately to toolroom standards on these fast, compact, automatic machines. Shortage of skilled labor is no handicap to using these machines effectively and economically.

High production of small gears and pinions is definitely assured because these Waltham machines have the power and speed to handle a large quantity of work in short time. For small pinions fully automatic operation may be obtained by using a magazine fed machine specially designed for this work.

Waltham Pinion and Gear Cutters are ideal for the production of such parts as watch, meter and gauge pinions, gears and sectors. Cutters for these machines and other machines are available from Waltham. Investigate TODAY by sending for detailed information.

ARCH TYPE

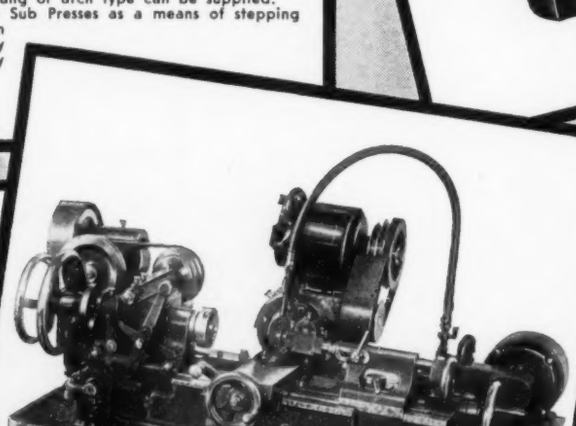
WALTHAM SUB PRESSES

Waltham Cylindrical Sub Presses supplied with suitable dies can be depended on to turn out work of uniformly high quality and precision. Because clean quality stampings are assured at all times, use of this equipment assures big savings in time and money.

Sturdy, rigid construction and perfect alignment of parts assures maintained accuracy even on long runs. Easy adjustment for wear makes it a simple matter to maintain close fit. Either overhang or arch type can be supplied.

Investigate Waltham Sub Presses as a means of stepping up your production through their ability to turn out parts ready for assembly.

Ask for details.



THREAD MILLING MACHINE WITH 3 MOTOR DRIVE

WALTHAM THREAD MILLERS

Precision thread milling on a production basis is assured by modern floor type Waltham Thread Millers.

Modern in every detail, these machines are remarkably versatile in the wide range of work they can handle. They are ideal machines for both tool room and production requirements.

These machines will mill precision threads of standard forms such as V, N.S., Whitworth, Buttress, etc., conveniently, quickly and accurately. Cutters for these forms can be supplied.

The three motor drive (speed, feed and oil) recently adopted adds rigidity to the cutter head and increases the speed range. Taper and compensating attachments can be supplied also a motor driven internal cutter head of improved design.

WALTHAM MACHINE WORKS WALTHAM MASS.

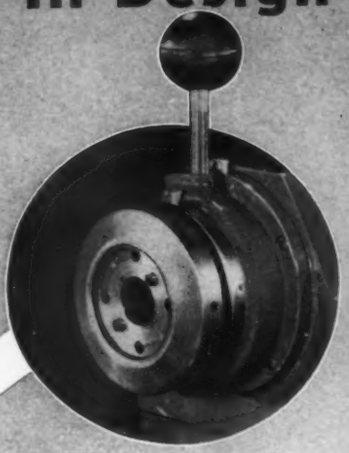
RIVETT AIMS AT PERFECTION

In Performance

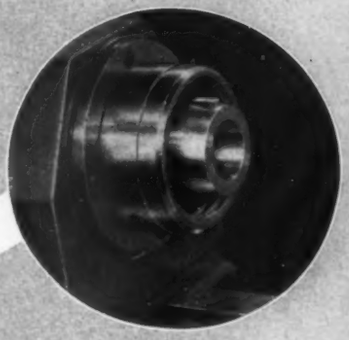
THE RIVETT HAND SCREW MACHINE reflects these objectives in production by its economy, operating convenience and precision. The value of this machine should be considered and recognized for initial and second operations on small precision work. Many jobs now produced on heavy, costlier units are more quickly set up and finished to closer limits on Rivett hand screw machines. The "critical," larger machines are thus released for more suitable work.

Send for
Bulletin 918A

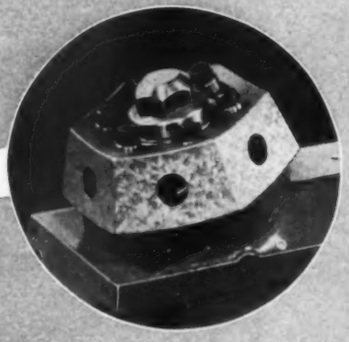
In Design



Positive Lever Chucking



Ball Bearing Spindle



Self-Locking Turret

RIVETT 918
HAND SCREW MACHINE

9" Swing over Bed
6" Capacity with Jaw Chucks
6" Capacity with Stop Chucks
1" Capacity with Draw-in Collets
or
1" Capacity with Push-out Collets
8 Spindle speeds 150-2500 r.p.m.
or
8 Spindle speeds 225-3750 r.p.m.

RIVETT LATHE & GRINDER INC.

BRIGHTON, BOSTON, MASS.

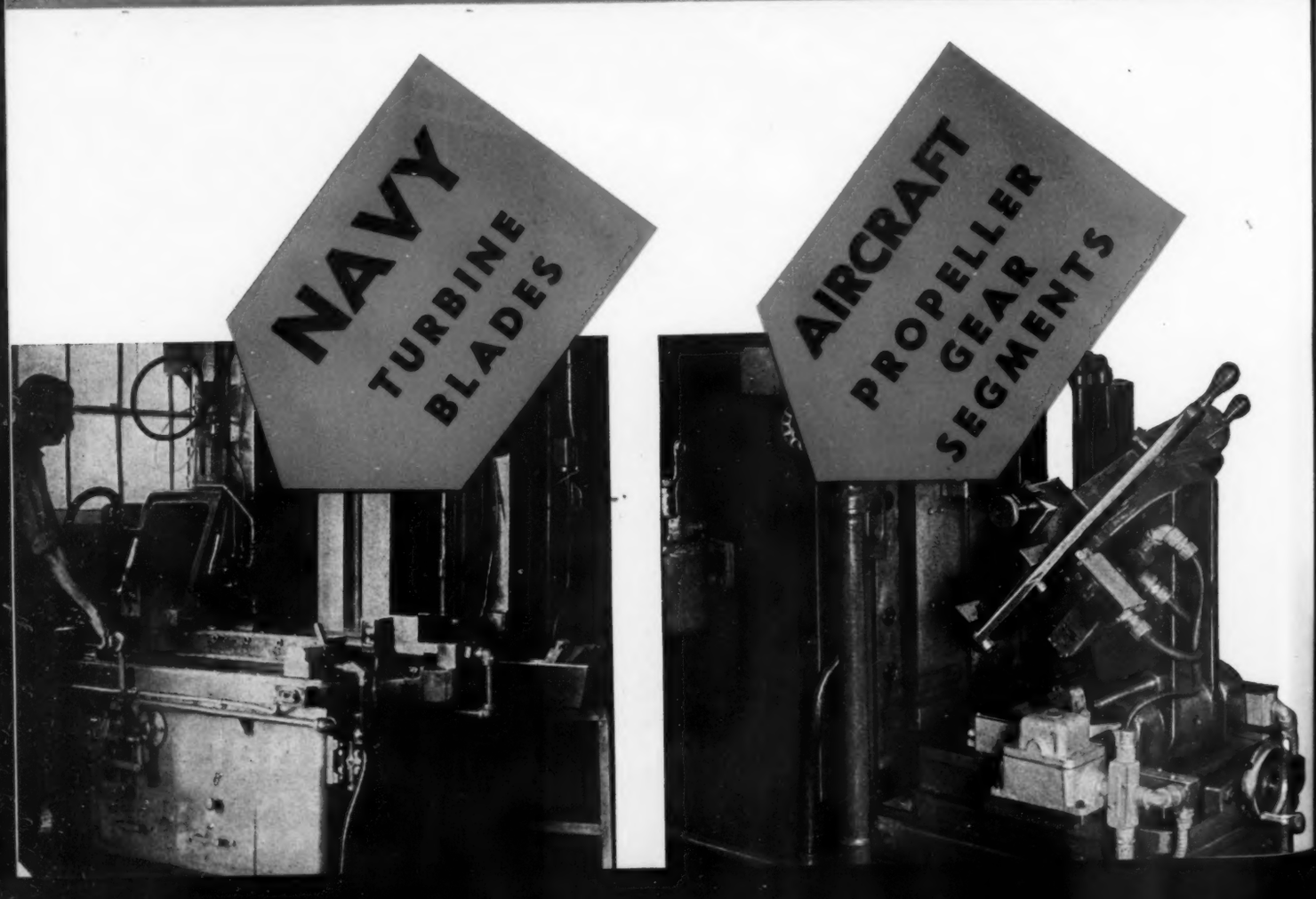
PIONEERS IN BENCH LATHE DEVELOPMENT

SPEED BROACHING FOR

Constantly increasing in speed, in scope and in accuracy, Lapointe broaching methods are now being used in the production of munitions for every branch of our armed services. The operations shown below represent some of the latest Lapointe developments. All require accuracy of the highest order. And, with all-out war production demanding maximum output from every machine, Lapointe Broaching Machines and Broaches are making rapid, accurate operations out of what were formerly slow, expensive jobs of metal-removal.

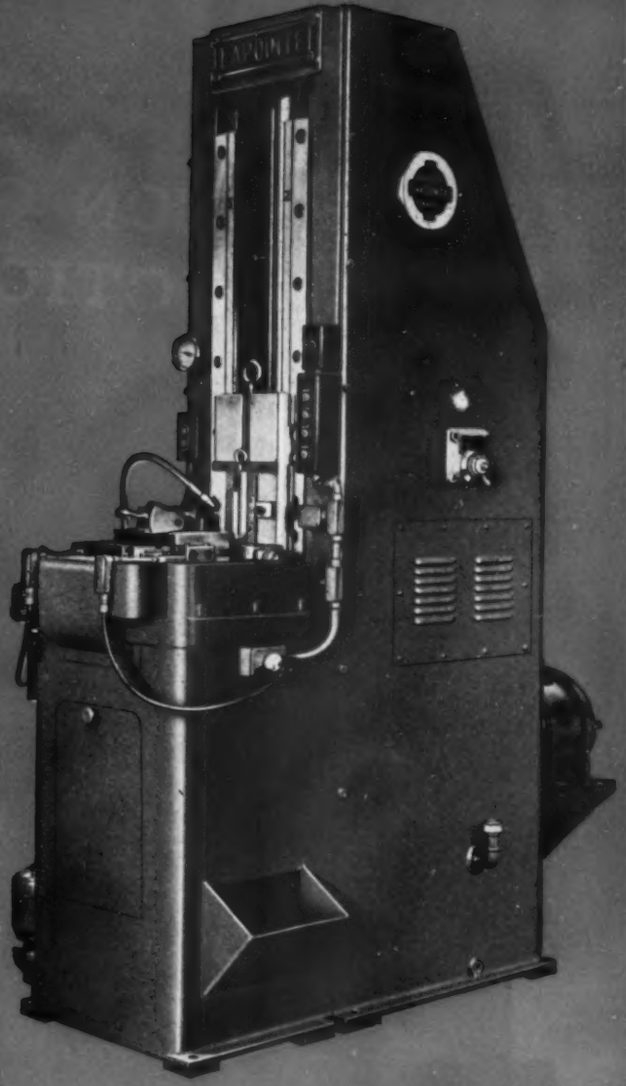
If you are looking for ways to do your jobs of munitions production faster—and better—outline your problems to our engineering department, and let us show you the latest Lapointe developments, capable of the high speeds and exceptional accuracy that aircraft and munitions production demands.

LAPOINTE M



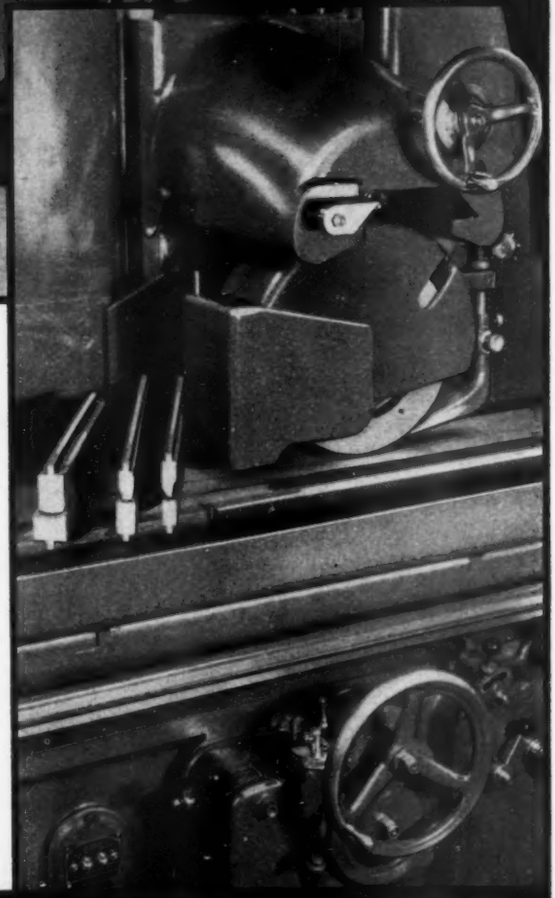
~~DEFENSE~~

all-out
War
Production



MACHINE TOOL CO.
HUDSON, MASS.

MATTISON GRINDER *SPEEDS UP* PRODUCTION AT VERSON . .



PRESS brake dies are being precision ground at high speed on the 30" x 168" Mattison Surface Grinder shown in the photographs. This machine is installed at the Verson All-steel Press Company where exacting manufacturing specifications demand excellent finishes within close limits of accuracy. The steel bars are ground lengthwise on four sides, cut to length, machined to shape, and finish-ground on sides and top. Substantial savings have been effected at Verson through the substitution of grinding for planing in this application.

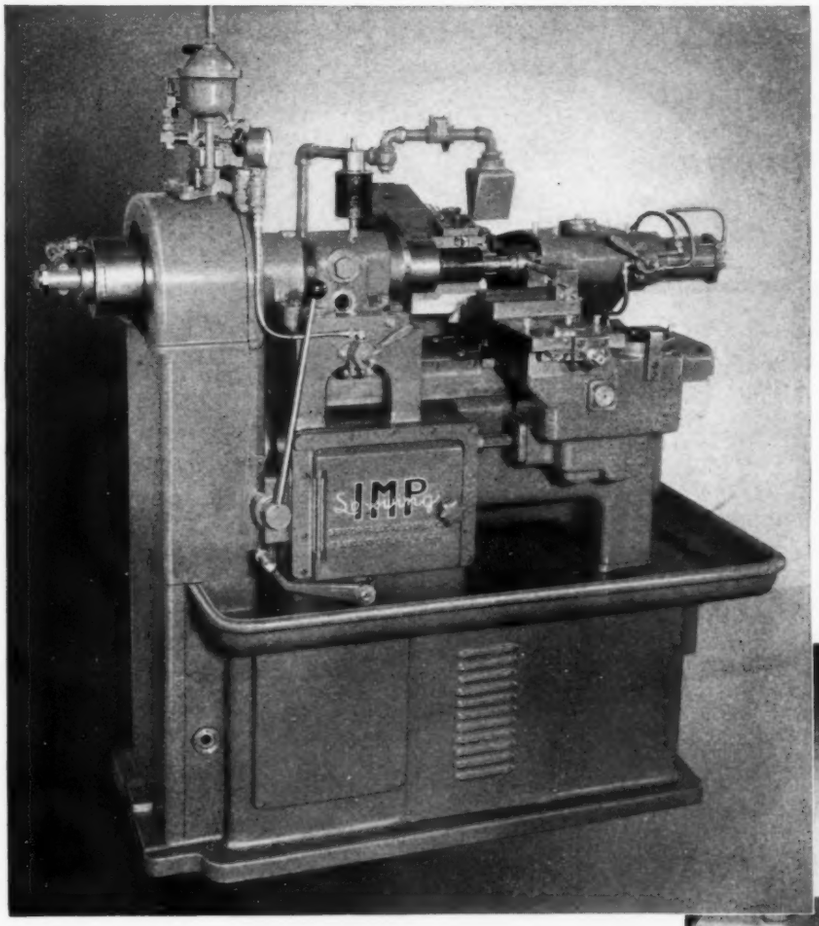
Rugged, high powered and versatile, Mattison Surface Grinders are built to do your grinding job better and in less time. They are offered in a wide range of sizes to meet every requirement—from 12" to 36" wide by 36" to 192" long.

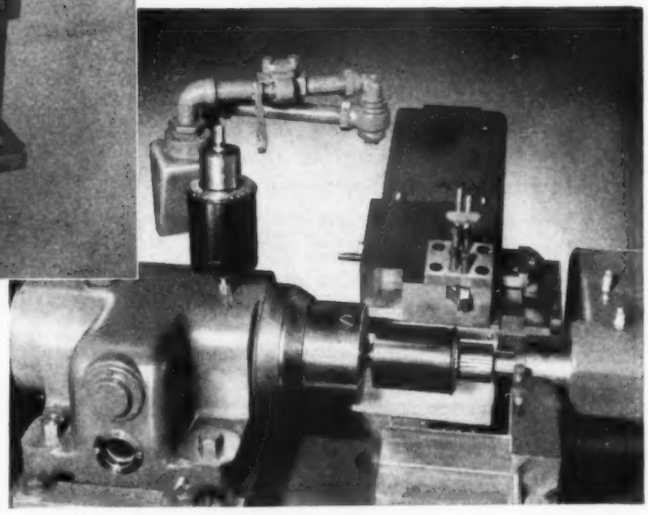
MATTISON MACHINE WORKS—ROCKFORD, ILLINOIS

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

Lo-swing IMP LATHE AUTOMATICALLY TURNS AND FACES COMMUTATORS TO HIGH ACCURACY AND FINISH REQUIREMENTS





Close-up showing detail of template-controlled facing tool on Back Attachment.

PROBLEM: To automatically turn and face electric starter commutators; to provide a fine finish and maintain extremely close tolerances.

SOLUTION: The Lo-swing IMP Lathe with special equipment was selected for this job primarily because of inherent design features. Its spindle bearings are designed to permit the very high spindle speeds necessary for turning copper alloy, and the method of fitting the carriage to the bed, with flat and "V" ways, assures unusual turning accuracy.

The work is held and driven from one of the ball bearing seats of the shaft with an air-operated collet chuck. The tailstock end is supported on the other bearing seat by a collet chuck mounted in a revolving spindle which is operated through the air-controlled tailstock spindle quill. This method of holding and driving the rotor from the ball bearing seats assures the close concentricity which is required between the bearing seats and the O. D. of the commutator. The operation consists of turning the O. D. of the commutator, the facing of the angular shoulder (which is part of the commutator) and the chamfering of the shoulder. It should be noted that the 6° angle is faced with a template-operated tool block in order to obtain a very smooth finish, free from all chatter marks.

THINK of THIS . . .

. . . a JIG BORER for less than you can get for your old second hand milling machine which should be thrown in the cupola . . . . . .

The 40-H INDEX is a high speed vertical milling machine designed to do end mill work with high speed end mills from ⅛" to ⅝" diameter. It is equipped with spindle travel making it handy for drilling, provided with speeds fast enough for milling with small end mills and slow enough for boring up to 3" holes in steel and equipped with verniers for locating. A jig or fixture 8"x16" in area by 12" high can be worked at one setting. Power feeds available to spindle and table as extras.

Hundreds of these machines are now working in Defense Plants on tool, die, experimental and production work and doing the work so well that users say it is the best machine of its kind on the market today. Let us tell you about it.

REASONABLE DELIVERY!

Recent additions to our production capacity enable us to make quick delivery of machines for defense work.

BLANK & BUXTON MACHINERY COMPANY

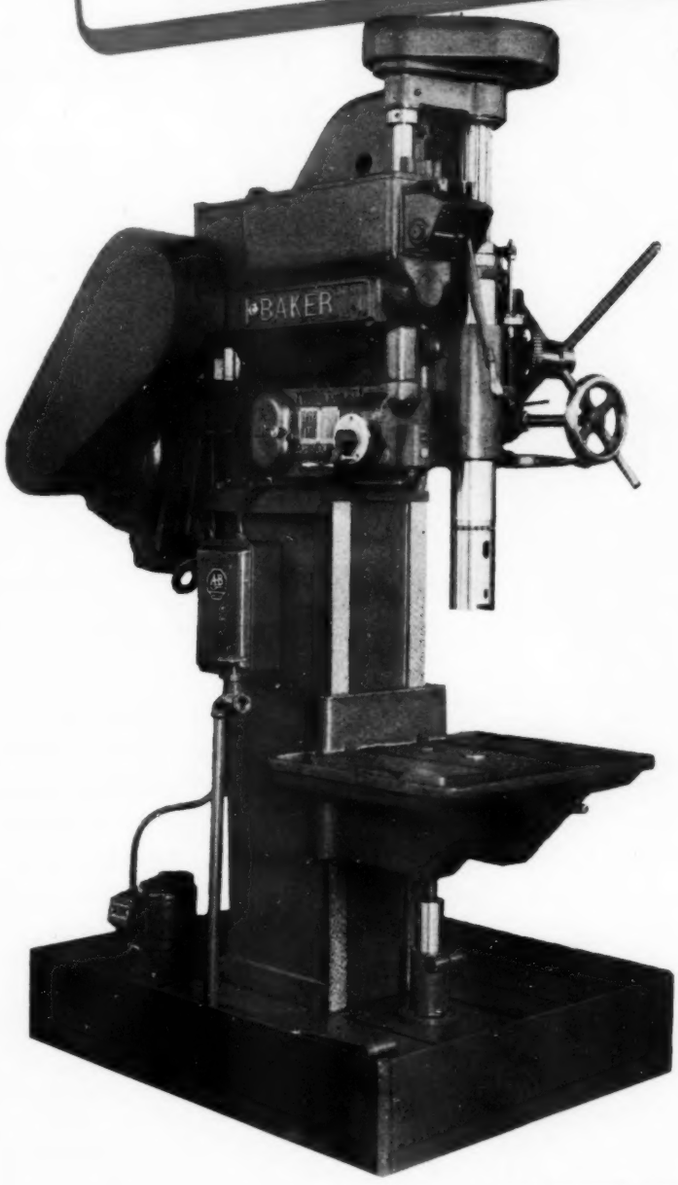
3106 E. Michigan Ave.
JACKSON, MICHIGAN

BAKER DRILLS

... DEFENSE WORK CALLS FOR HEAVY DRILLS ...

... the answer ...

OUR NEW MODEL 314A



This new model, designed and built for heavy, sustained operation, is an ideal unit for use on tank parts, aircraft engines, landing gear assemblies, gun mounts, and the thousand and one other heavy drilling operations connected with defense production. And, aside from its economies during the current emergency, it represents a sound investment for future peacetime operations.
Consider its value now and later, too.

CAPACITY: Drill 3" in diameter in solid steel

TYPE: Universal Quick change
Geared Feed

Construction Features:

1 Heavy Multi-Splined Spindle
2 Speed Box Gears Finished by Shaving and "Fellows" Flame Hardening
3 Two Piece Vertical Column Design

WRITE FOR OUR NEW CIRCULAR, OR CONTACT OUR NEAREST REPRESENTATIVE

F. F. Barber Machinery Co.	Toronto, Ont.
F. F. Barber Machinery Co.	Walkerville, Ont.
Chandler Machinery Co.	Atlanta, Ga.
R. L. Crane Machinery Co.	Buffalo, N. Y.
Mr. Jos. F. Dohan	New Orleans, La.
Harron, Rickard & McCone Co.	San Francisco, Calif.
Machinery Sales Co.	Los Angeles, Calif.
Marshall & Huschart Machy Co.	Chicago, Ill.
McVoy Hausman Co.	Birmingham, Ala.
Motch & Merryweather Machy Co.	Cleveland, Ohio
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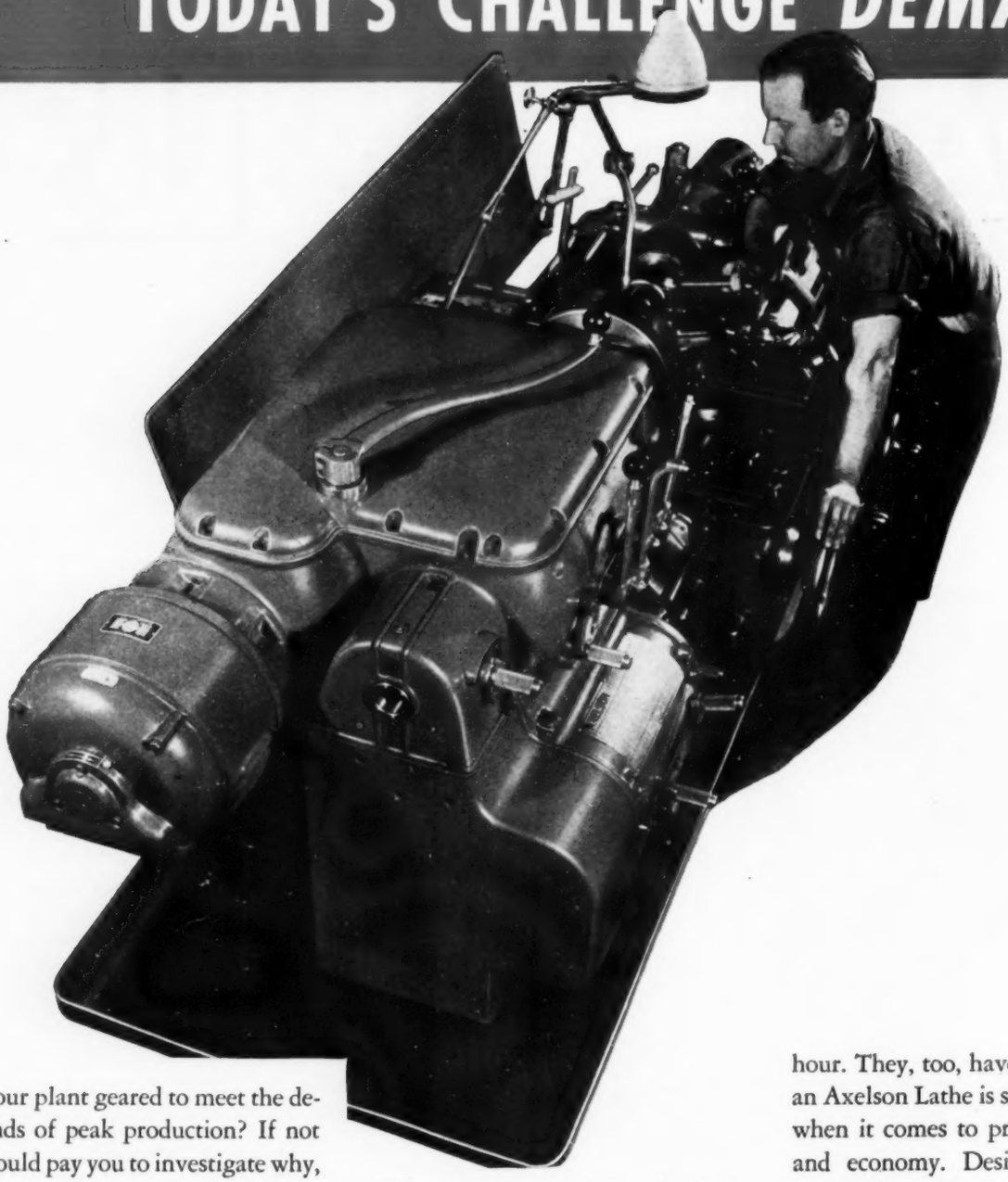
OUR MOTTO SINCE 1867

"MACHINES: STURDY and EFFICIENT, AS FINE AS CAN BE BUILT"

BAKER BROTHERS INC. Toledo, Ohio, U.S.A.

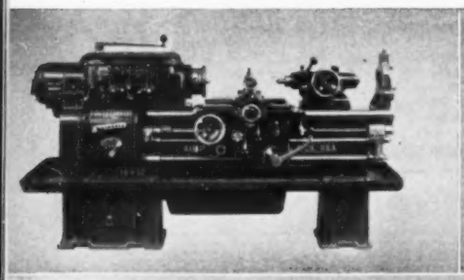
DRILLING • BORING • TAPPING • AND • KEYSEATING MACHINES

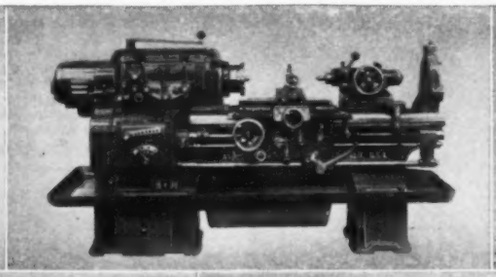
TODAY'S CHALLENGE DEMANDS

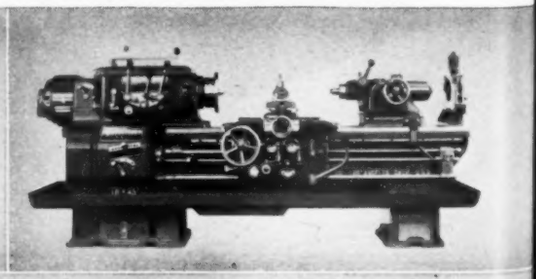


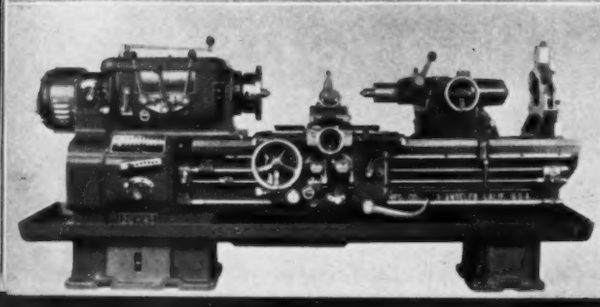
Is your plant geared to meet the demands of peak production? If not it would pay you to investigate why, now more than ever, Axelson can help you meet the challenge of increased plant operations.

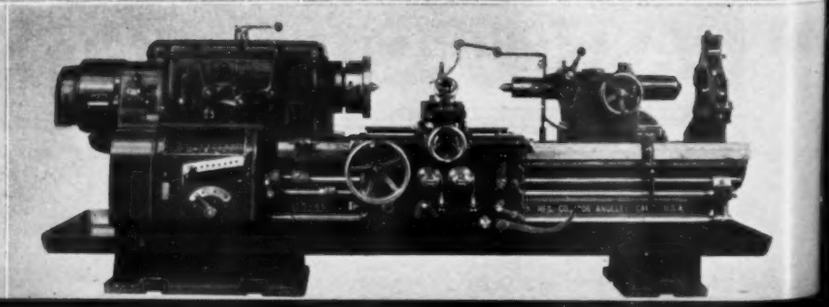
Wise executives find that Axelson heavy duty lathes increase plant capacity at lowest cost per man hour. They, too, have learned that an Axelson Lathe is second to none when it comes to precision, speed and economy. Design, materials and workmanship have been combined to make "Axelson" the outstanding name in lathes today.











PEAK PRODUCTION!

AXELSON HEAVY DUTY LATHES ARE AVAILABLE IN SIX STANDARD SIZES AND VARIOUS LENGTHS

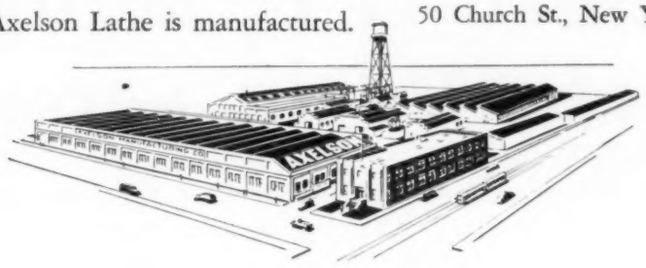
Axelson's staff of skilled engineers, with over 25 years experience, has incorporated in each Axelson Lathe all the features necessary for precision, high speed craftsmanship.

In addition, the man who purchases an Axelson Lathe today is certain to find his investment a more profitable one for he has secured a real value in his original purchase. Built to the highest standards in every way, Axelson Lathes are continuing to deliver utmost satisfaction to defense manufacturing plants and machine shops all over the nation and in foreign countries. Defense contractors will tell you that the minimum of maintenance required by Axelson Lathes is directly traceable to the exacting precision under which each Axelson Lathe is manufactured.

COMPARE THESE AXELSON FEATURES:

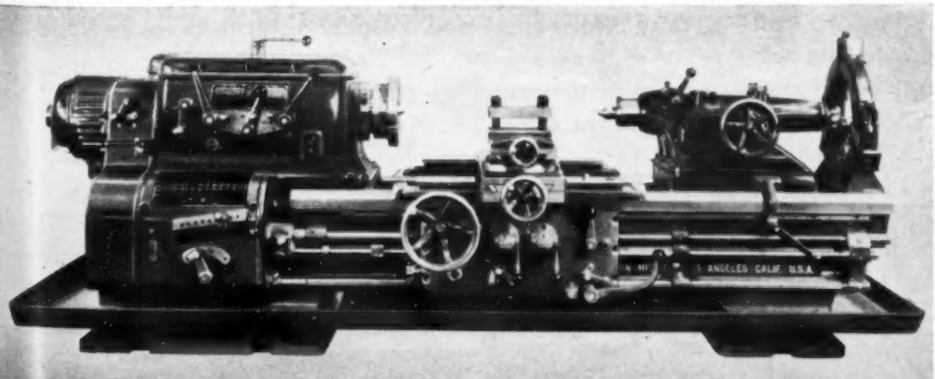
- 24-SPEED HEADSTOCK
- UNITED MOUNTED CONSTANT SPEED MOTOR
- HARDENED AND GROUND GEARS
- AUTOMATIC BRAKE
- DOUBLE CLUTCH FOR FORWARD AND REVERSE SPINDLE ROTATION
- AUTOMATIC LUBRICATION OF HALF-NUT AND LEAD SCREW WHEN THREADING
- ANTI-FRICTION QUICK CHANGE GEAR BOX
- AUTOMATIC LUBRICATION OF BED WAYS, CROSS SLIDE, COMPOUND SLIDE, CROSS FEED SCREW NUT AND COMPOUND SCREW NUT
- AUTOMATICALLY LUBRICATED APRON
- RIGID TAPER ATTACHMENT
- ACCURATE MASTER-MILLED LEAD SCREW
- CAM-LOCK SPINDLE NOSE
- 2-SPEED TAILSTOCK SPINDLE

AXELSON MANUFACTURING COMPANY
6160 South Boyle Avenue, Los Angeles, California
(P. O. Box 98, Vernon Station)
50 Church St., New York • 3844 Walsh St., St. Louis



For over 25 years Axelson has been manufacturing lathes which have established a reputation for quality and satisfactory performance.

AXELSON LATHES ARE BUILT IN 14", 16", 18", 20", 25" AND 32" SIZES

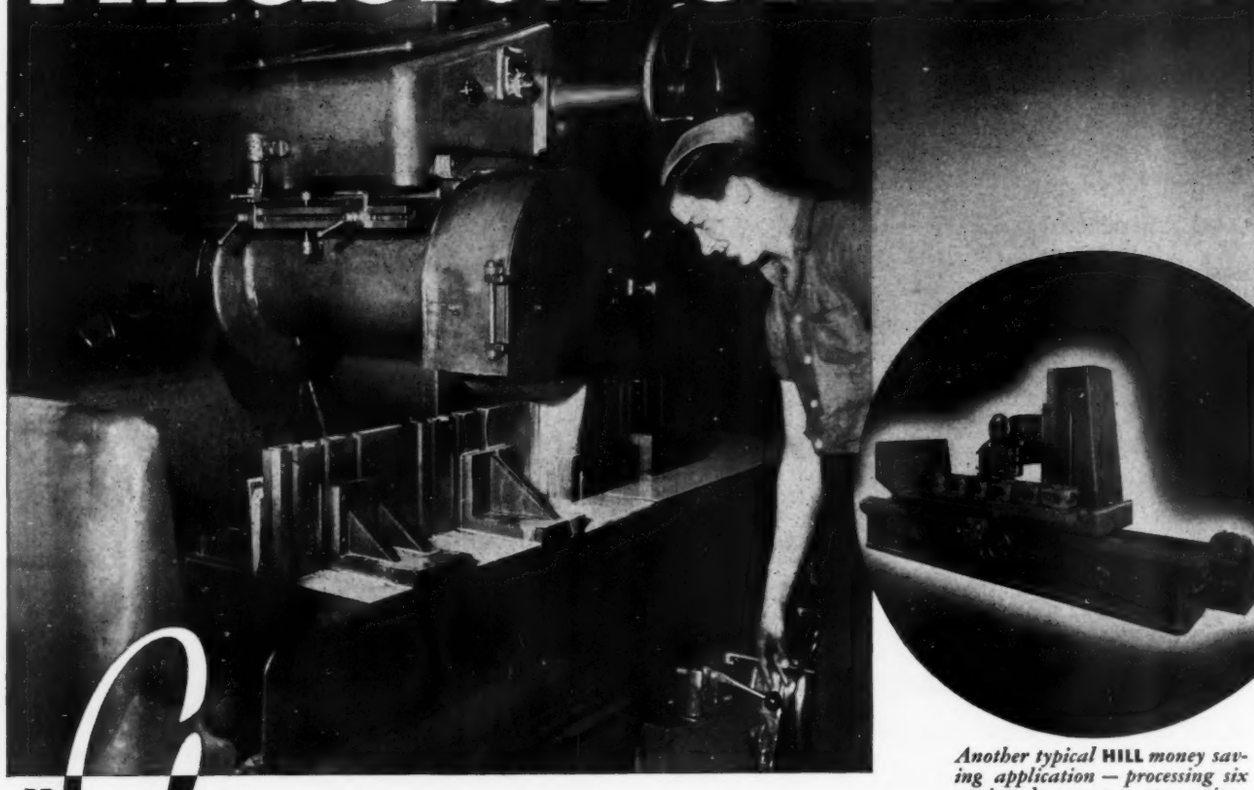


THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

WRITE TODAY *for your copy of the latest Lathe Bulletin giving detailed information on all sizes and types of Axelson Lathes*

Before you buy any lathe investigate AXELSON

PRECISION GRINDING



Another typical **HILL** *money saving application — processing six semi-steel gear cases at one time.*

"A fine degree of accuracy is absolutely necessary"

That is the kind of finish grinding specified by The National Acme Co. on tool slides for their Acme-Gridley multiple spindle automatics and that is the kind of ground finish achieved with their HILL *"Open Side"* Horizontal Spindle Hydraulic Surface Grinder. Notice that the tool slides are finish ground in "gangs", for speed and uniformity. The extremely close tolerances held by the HILL Hydraulic Grinder insures precision operation of the finished part in the complex mechanism of these automatics. HILL *"Open Side"* Surface Grinders are built in both Horizontal and Vertical Spindle types in a full range of sizes with table dimensions 18", 24" or 30" wide and 5 to 20 feet long. . . . An inquiry from you pertaining to your rough or finish grinding problems will receive prompt attention. No obligation, of course!

The HILL ACME CO.

A consolidation of two nationally known, fifty year old manufacturers:—The Hill Clutch Machine & Foundry Company . . . and The Acme Machinery Company
6400 BREAKWATER AVE., CLEVELAND, OHIO

14 CYLINDER HEADS AN HOUR

Baush Reams Valve Guide Holes Quickly - Accurately - for Packard Rolls Royce Aircraft Engines

● **THE JOB** — to finish taper ream both inlet and exhaust valve guide holes in the aluminum alloy cylinder head of the famed Rolls Royce Merlin Aircraft engine.

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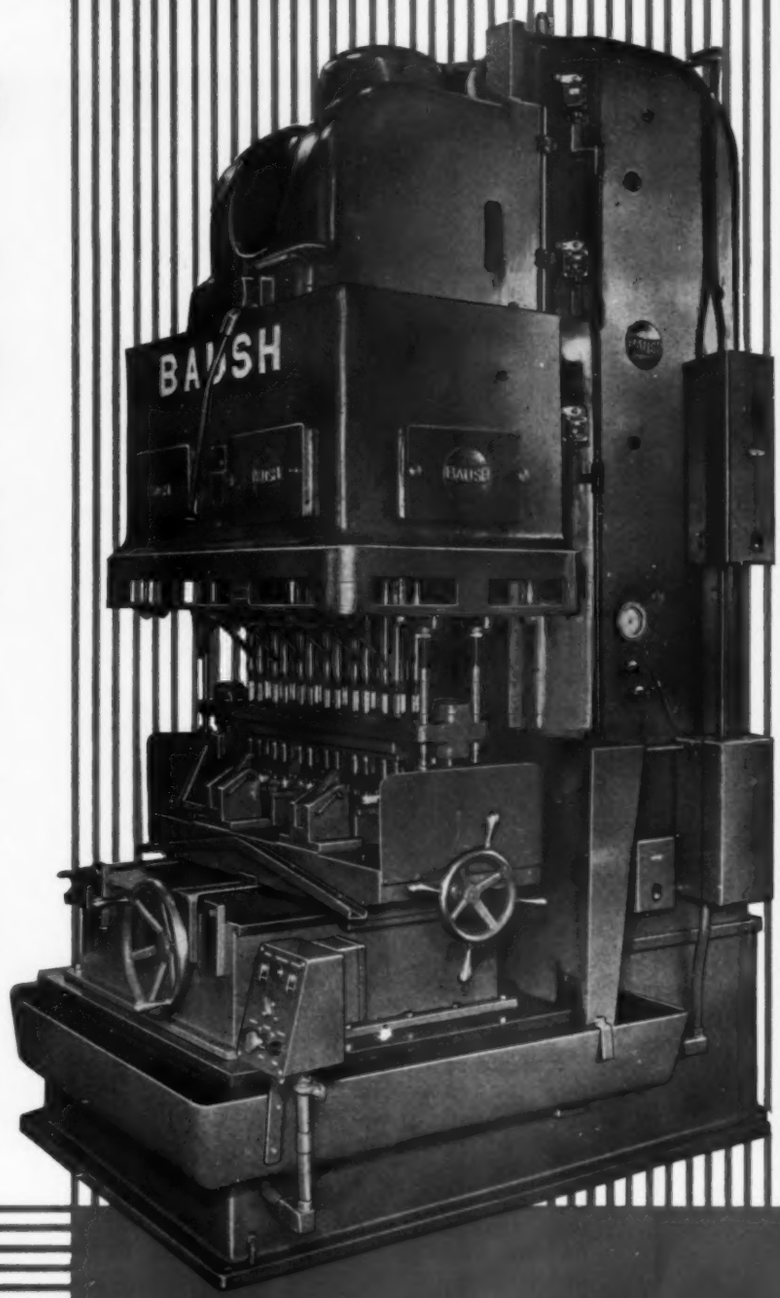

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1 Hydraulic clamping.
2 Adjustable roller stock lift.
3 Gooseneck supporting work firmly on both sides.
4 Vickers hydraulic low pressure system for feed and clamping.
5 Heat-treated alloy steel gearing and drive shafts.
6 Speed obtained through selective sliding gears on splined shafts mounted on anti-friction bearings.
7 Saw blade drive has all spur and helical gearing, requiring minimum amount of power.
8 Complete saw blade drive contained in saw carriage.
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IMPORTANT: For best results, use also Motch & Merryweather Segmental Saw Blades and the M. & M. Saw Grinder.

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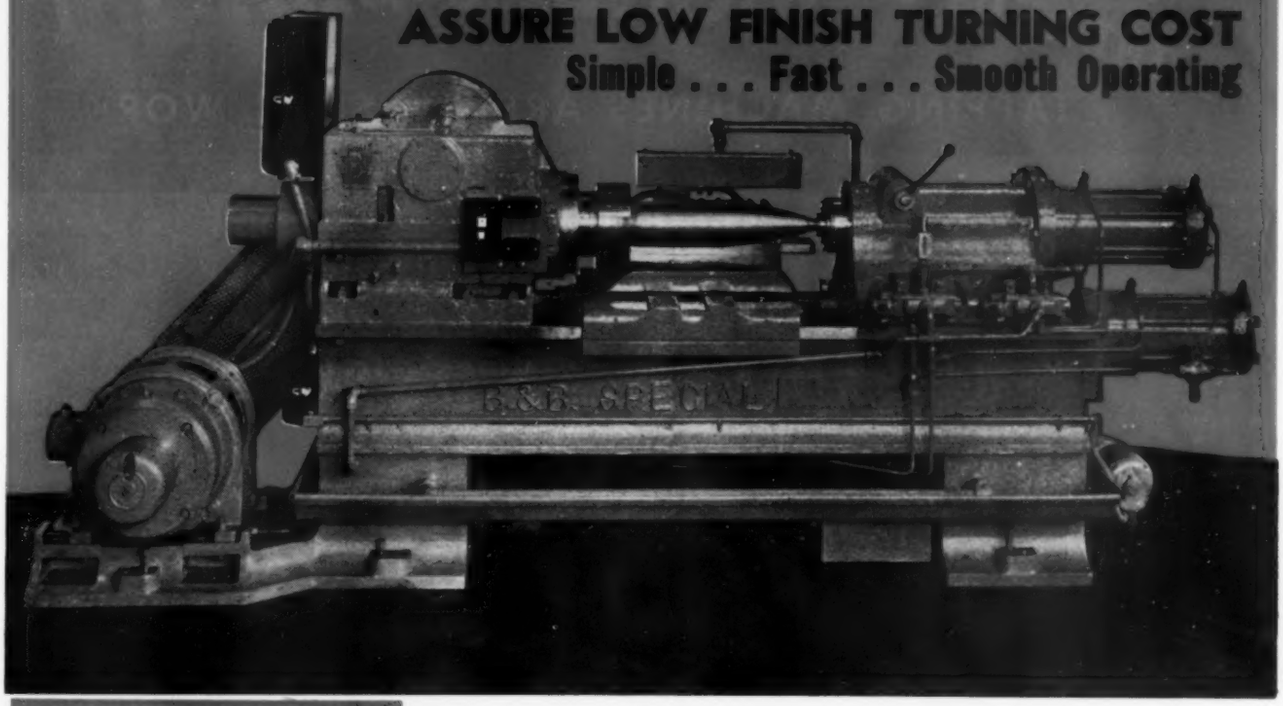
ASSURE LOW FINISH TURNING COST

Simple . . . Fast . . . Smooth Operating



For Shell in sizes from 75 MM. to 155 MM.

B & B Shell Machines for other operations consisting of—

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Rough Turn & Face Base
Bore Nose
Finish Turn (Illustrated)
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Turn Band Groove & Notch
Profile the I.D. Nose Contour for Weight Correction
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• Illustration shows a B & B 30 HP Finish Turning Lathe for 155 mm. Shell equipped for chucking on the Boat Tail. It features a Five Tool Carriage using Carbide Tools for turning —Hydraulic Feed to Carriage—Hydraulic operating Tailstock—Anti-friction Bearing Tailstock Center—Worm Gear Drive with Spindle mounted on Timken Bearings.

May be furnished with three tool carriage also chucking mechanism using hydraulic or air operated expanding mandrel for driving in nose.

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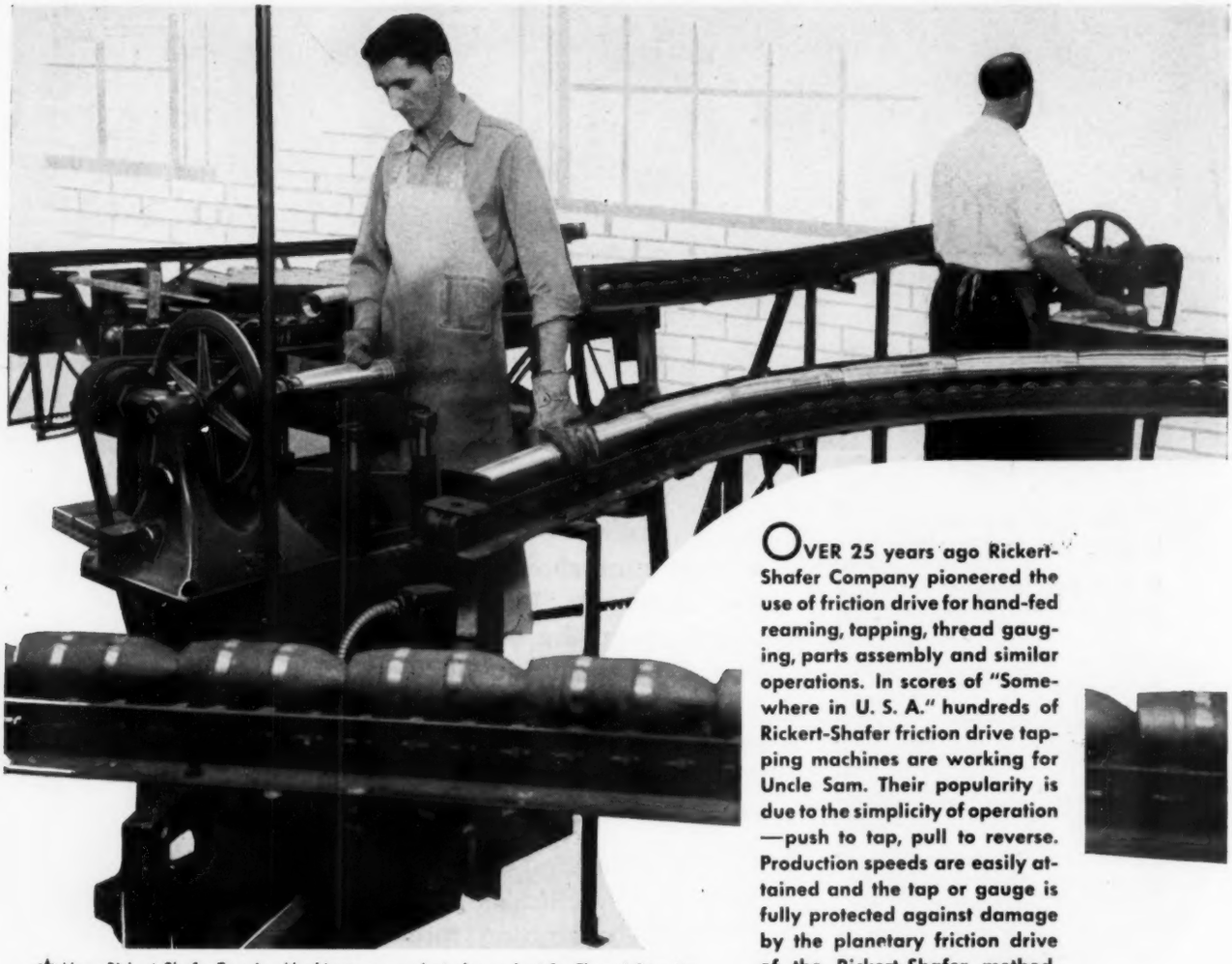
SOMEWHERE in U.S.A.
HUNDREDS OF RICKERT-SHAFER
TAPPING MACHINES ARE ON SHELL WORK



★ *Many Rickert-Shafer Tapping Machines are used at above plant for Thread Gauging 75 mm., 3" A. A., 155 mm. Army and 90 mm. H. E. shells. Above photo shows thread gauging of 75 mm. M48 Fuze Thread, Major Diameter 2.0000, Pitch Diameter 1.9459, Tolerance allowed .0106 plus or minus.*

OVER 25 years ago Rickert-Shafer Company pioneered the use of friction drive for hand-fed reaming, tapping, thread gauging, parts assembly and similar operations. In scores of "Somewhere in U. S. A." hundreds of Rickert-Shafer friction drive tapping machines are working for Uncle Sam. Their popularity is due to the simplicity of operation—push to tap, pull to reverse. Production speeds are easily attained and the tap or gauge is fully protected against damage by the planetary friction drive of the Rickert-Shafer method. Write for special applications to meet your production threading and thread gauging problem.

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8 INCH COLD METAL SAWING MACHINE.....

Put your metal sawing on a production basis for 1942...

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VERSATILE

With this Porter-McLeod machine you can definitely speed up production through making faster, cleaner, straighter cuts in stock.

An outstanding advantage offered by this modern cold metal production sawing machine is ability to nest economical quantities of bars and shapes for multiple cutting—a feature made possible by a unique method employed for holding the work. It has a capacity of 8" round and 7½" square, and will handle stock from 3" up. Fast cutting is assured by a standard 3" per minute feed.

High speed work, maintained accuracy of cuts and long blade wear are assured by a design which by feeding the blade upward to the stock protects it against riding or bumping. Accuracy and protection are further assured by front and back blade support close to the rim of the blade. Further insurance against blade breakage and an important factor in making this machine adaptable to almost any cutting condition is provided by a friction disc feed.

All of these features, together with the fact that on the Porter-McLeod *every tooth cuts*, results in a cold metal sawing machine which is truly a high production unit that will save time and reduce costs on a wide range of work.

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Write at once for Descriptive Illustrated Bulletin on the 8" Porter-McLeod Cold Metal Sawing Machine. Outline your problem. Ask for our recommendations.

MACHINE TOOL COMPANY

PORTER-McLEOD MACHINE TOOL CO., INC.
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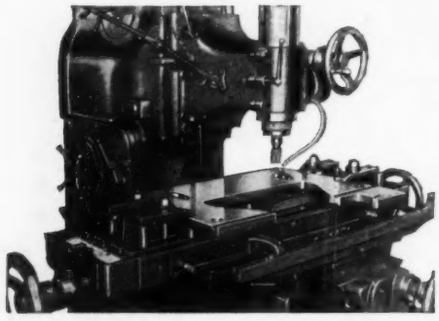
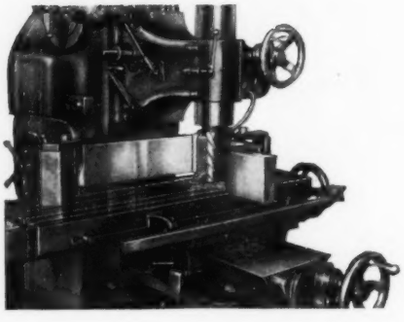
Balanced design makes KNIGHT Millers *adaptable to wide variety of work . .*



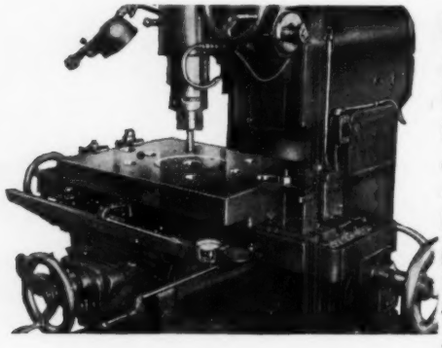
EXAMPLE 1.

LIGHTMILLING: Many operations were performed on the large one-inch steel plate at one setting, including profiling, milling, boring, slotting, and keyway cutting. KNIGHT Miller's wide range of spindle speeds, solid table unit, and ease of handling provide efficient production and accurate results on all of these operations.



EXAMPLE 2.

HEAVYMILLING: A two-inch diameter cutter, six inches long, was used on large forging to remove as much as five-sixteenths inch of stock in some places without appreciable spindle deflection. The forging was machined completely all over and met with rigid inspection for finish and tolerances. You can do tough jobs like this with your KNIGHT Miller.



EXAMPLE 3.

PRECISION BORING: Here a KNIGHT Miller is successfully handling a boring job on an eighteen inch by twenty - nine inch plate, two inches thick. Nine holes, ranging from one and one-eighth inches to two inches in diameter, were accurately bored to limits of plus or minus .0005". Dial indicators for quick and accurate locating, a large accurately fitted spindle to insure round and straight holes, and table slides that are square, make the KNIGHT Miller ideal for this work.

Read complete details on Balanced Design and other* KNIGHT Miller *features in new catalog

RIGIDITY: Firmness that insures high standards of workmanship and production volume.

ACCURACY: The result of design as well as precision of workmanship and the quality of materials used.

VERSATILITY: Capabilities which greatly simplify many set-ups that would otherwise be difficult to obtain.

ACCESSIBILITY: From either a sitting or standing position, the operator always has a clear vision of the job—one set of simple, convenient directional controls, for both hand and power operation, within easy reach.

CAPACITY: Sixteen changes in speed, in either direction, give the spindle ample range to meet a wide variety of requirements.

PRECISION BORING: KNIGHT Millers have the necessary requirements for precision boring of jigs and fixtures, and for accurately locating and boring on a production basis where it is not economical to make special tools.

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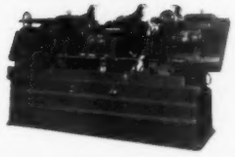
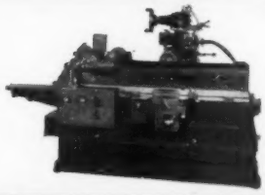
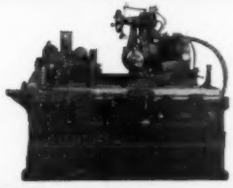


On Mass Production Work: Multiple precision grinding with special machines like these using standard Bowgage Wheelhead units.



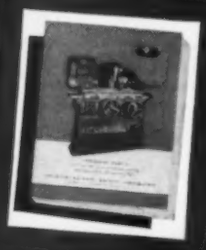
On Splines: Greater accuracy at higher speed saves on assembly time, evens torque pressures and produces finishes that wear better on sliding splines, to cut costs and boost profits.

On Plain Cylindrical Work: By cutting out costly frills not needed on normal work and standardizing on low cost, rigidly accurate, long-lived Fitchburg Grinders. They cost less to start with, save money as you use them.



On Gear Grinding: The formed wheel method with an automatic closed cycle produces results in finish and accuracy with speed that will bring out hidden profits.

On Tool Room and Small Lot Work: With Bath full universal grinders, easily and quickly adaptable to external, internal, surface, gear cutter and tool grinding. With this one machine you can do a wide range of precision work.



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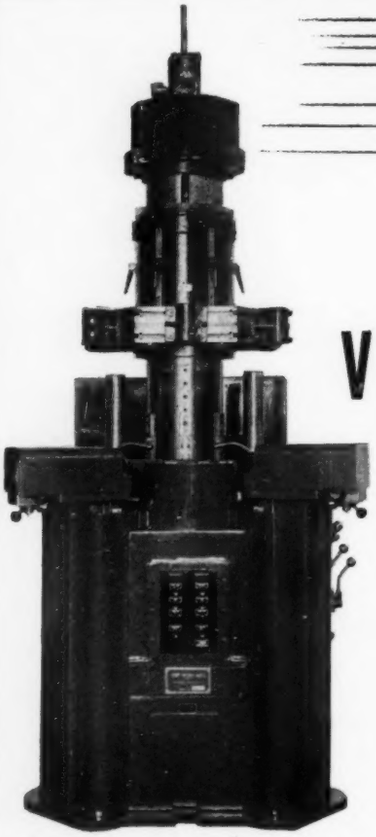

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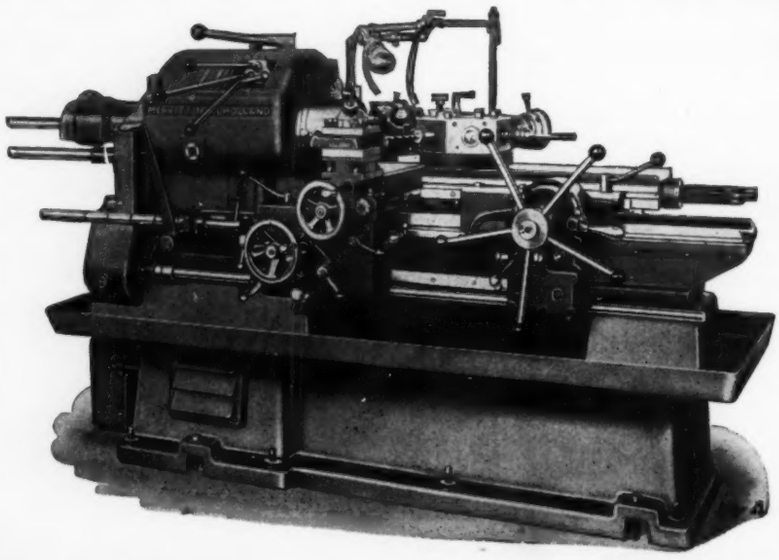

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1 MILLING MACHINES—Portman Machine Tool Co., Mt. Vernon, N. Y. 6-page illustrated folder describes in detail with diagrams, features and specifications. Outlines five available attachments.

2 SAWING MACHINES — Johnson Machine Works, Inc., Albion, Mich. 4-page illustrated folder provides check list of advantages and points out important features. Photos of machine in action and general specifications given.

3 PRESSES—E. W. Bliss Co., Brooklyn, N. Y. 32-page beautifully illustrated catalog shows presses in operation making war materials. Actual operation photos provide an interesting story.

4 TURRET LATHES—Warney & Swasey Co., Cleveland, O. 24-page illustrated catalog on No. 3 A Universal, heavy-duty turret lathe with 4½ in. or 6 in. bar capacity, and 23½ in. chucking swing. Specifications provided and detailed, diagrammatic shots of machine show construction. Machine demonstrated in actual operation. Gives information on proper tooling for increased production. Describes set of bar and chucking tools for flexibility of set-ups, and chuck and chuck wrenches.

5 MILLING machines—J. L. Lucas & Son, Inc., Bridgeport, Conn. 4-page illustrated folder describes No. 2 American Plain Milling Machine with infinite spindle speeds, standardized spindle nose, motor-in-base drive and heavy rugged construction. Gives facts and specifications of machines.

6 HYDRAULIC MACHINERY—Watson-Stillman Co., Roselle, N. J. 12-page, Bulletin 120-A has helpful information for hydraulic engineers, such as capacities of hydraulic rams, medium carbon seamless steel pipe data, decimal equivalents, circumferences and areas of circles, metric conversion tables, strength of materials, and useful hydraulic formulae.

7 MILLING MACHINES—Granite State Machine Co., Inc., Manchester, N. H. 4-page illustrated folder on G & S vertical mill and jig borer gives specifications and list of extra equipment.

8 MILLING MACHINES—C. C. Bradley & Sons, Inc., Syracuse, N. Y. 4-page illustrated folder describes with specifications new, improved Briggs production type milling machine. Various parts of machine described and illustrated.

9 TOOL GRINDERS—James Donaldson Co. Inc., New York, N. Y. 12-page illustrated folder describes Bura Precision Form Grinder, a precision machine for the scientific forming and grinding of tool bits. Describes how Bura-Way of grinding tools is applicable to all forms of convex single-point tools, how it will do more accurate work and give longer tool life, while speeding retooling, and how it will cheat scrap pile and requires less skilled labor.

10 SLOTTERS — Douglas Machinery Co., New York, N. Y. 8-page illustrated folder on precision slotter describes adaptability to both toolroom and production work. Describes machine in detail with diagrams and gives specifications.

11 SAWING MACHINES—J. D. Wallace & Co., Chicago, Ill. 4-page folder describes No. 1 Radial Saw with shop table and roller extensions. Has many uses and is popular in aircraft industry for cutting duralumin, etc. Illustrations show quick, easy adjustments with graduated dials and scales.

12 PRESSES — Denison Engineering Co., Columbus, O. 4-page folder describes two ways to get increased production from your assembling presses for straightening or bending through emergency tooling. Also 4-page folder on how to get triple duty from straightening presses for assembling, bending and broaching through guide to emergency tooling. Valuable hints.

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TOOLS AND ACCESSORIES

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14 MACHINE ATTACHMENTS—Rusnok Tool Works, Chicago, Ill. Illustrated folder describes Model ST motor-driven milling-drilling-boring attachment designed for heavy duty and mill operation. Also vertical milling head attachment of movable quill type.

15 TOOL HOLDERS — Auto-Ordnance Corp., Bridgeport, Conn. 8-page illustrated folder describes Willard Spring Tool Holders for offset, threading and cutting off. Also cutters.

16 CARBIDE TOOLS—Carboloy Co., Detroit, Mich. 12-page catalog has complete study of how one man coordinates use and maintenance of Carboloy tools in Falk Corporation plant. Shows how Falk selected nine standard stock tool styles for adaptation to 89 percent of all carbide tool applications. Diagrams show how these blanks were ground to desired shapes for various operations. An interesting and informative case study.

17 DIE CRADLES—Acro Tool and Die Works, Chicago, Ill. 6-page illustrated folder describes and diagrams die cradle, a parallel unit that provides easier, more accurate method for drilling, counterboring, tapping, milling and grinding. Prices and specifications.

18 POLISHING WHEELS, BLOCKS AND PENCILS. Weldon Roberts Rubber Co., Newark, N. J. 6-page illustrated folder 53A describes Brightboy wheels, discs, tablets and sticks for polishing and finishing. Uses and construction given with list of sizes and prices. Handy reference.

19 SURFACE PLATES—Lombard Governor Corp., Ashland, Mass. Illustrated folder describes line of surface plates giving size, weights and prices. Features of construction and advantages of use pointed out.

HEAT-TREATING AND WELDING EQUIPMENT

20 WELDING MACHINES — Lincoln Electric Co., Cleveland, O. 20-page illustrated Bulletin 412 on "Shield-Arc", the welder with self-indicating dual continuous control. Describes in detail job selector, while diagrams show control type and size of welding arc. Many illustrations show welder in actual use with diagrams of volts and amperes used in job. Many advantages and features outlined in detail, and available types given. Interesting and informative.

21 ARC WELDERS—Borm Mfg. Co., Elgin, Ill. Illustrated folder describes line of Elgin a.c. type electric arc welders with features, descriptions, specifications and weights. Also information on electric brazing torch, pneumatic body and fender hammer and pipe saw.

22 WELDING RODS—American Manganese Steel Div., Chicago Heights, Ill. 12-page illustrated bulletin 941-W has information on nickle-manganese steel welding rods, Mo-Mang welding rods, hard-facing welding rods, die welds, etc.

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23 FINISHING AND TUMBLING BARRELS—Globe Machine & Stamping Co., Cleveland, O. 12-page catalog tells how Globe barrels can finish your product faster, better and more cheaply. Diagrams and illustrations show features and design. Complete specifications both on barrels and motors for various types given. Comments from satisfied users.

24 MOLYBDENUM — Climax Molybdenum Co., New York, N. Y. 20-page booklet, "Molybdenum in Steel" gives detailed engineering data on carbon-molybdenum, chromium-molybdenum, nickel-molybdenum, nickel-chromium-molybdenum, manganese-molybdenum, silicon-molybdenum, nitriding and molybdenum high-speed and die steels. Valuable reference.

25 WELDING ALUMINUM—Aluminum Co. of America, Pittsburgh, Pa. 48-page booklet describes in detail, fusion welding, welding aluminum vessels, torch welding heat-treated aluminum alloys, welding castings, arc welding, resistance welding, and other valuable engineering data.

26 MEHANITE — Mechanite Research Institute of America, Pittsburgh, Pa. 12-page catalog "Mechanite Castings in Defense Work", gives engineering data including physical properties and general engineering types. Illustrations show its use in aircraft manufacture, gun and shell manufacture, machine tool castings and radial, marine and truck equipment.

27 NUTS—Elastic Stop Nut Corp., Union, N. J. 60-page newly revised general catalog of elastic stop nuts and aircraft fittings gives useful and informative information. Specifications and prices. Shows typical applications of products with handy engineering data. Thorough and complete piece.

28 VINYLITE—Bakelite Corp., New York, N. Y. 31-page, plastic-bound book on Vinylite plastic sheets and sheeting. Uses this material on covers of catalog. Contains for first time complete data on various sheet forms available. Complete descriptions given for plasticized sheets and sheeting, and for film or plastic fabric. Available forms, characteristics, properties, and uses included.

29 CONVEYOR CHAINS — Whitney Chain & Mfg. Co., Hartford, Conn. 60-page plastic-bound general catalog on conveyor chains and sprockets gives application illustrations, engineering data, and complete specifications and prices on chains and sprockets for various uses.

30 DIE SPRINGS—Muehlhausen Spring Corp., Logansport, Ind. Large size, 4-page, stiff-paper folder describes size springs for high-speed presses, regular-speed presses, and for heavy-duty presses. Valuable for reorder and specifications.

31 AMPCO METAL — Ampco Metal, Inc., Milwaukee, Wis. 6-page folder "Ampco Metal in Dies" describes advantages and illustrates use. Also, 6-page illustrated folder "Ampco Metal in Machine Tools" shows actual use in machines and features of use.

32 STAINLESS-CLAD STEEL—Jessop Steel Co., Washington, Pa. 16-page price list for Silver-Ply Stainless-Clad steel gives base prices for sheets and plates for 12 grades of cladding, in proportionate thicknesses of cladding from 5 to 50 percent. Includes tables on machining, shearing and flatness tolerances, estimated weights and size limits for standard production plates and sheets. Also contains prices for forming standard flanged and dished heads, as well as prices for machining heads.

33 MACHINING ALUMINUM—Aluminum Co. of America, Pittsburgh, Pa. 32-page folder gives valuable engineering information on general machining and automatic screw machine practice on aluminum and aluminum alloys, plus tables for approximate feeds for standard tools for machining Alcoa. Also physical properties, typical mechanical properties, comparative weight of standard screw machine stock, and tolerances.

34 MINIATURE BEARINGS — Miniature Precision Bearings, Keene, N. H. 8-page catalog No. 41 describes radial, pivot and special bearings in miniature precision sizes. Applications, technical data and various specifications given.

35 MAGNESIUM—American Magnesium Corp., Cleveland, O. 32-page booklet, gives properties of Mazlo magnesium products. Includes general characteristics, castings, wrought products, fabricating, and finishes. Valuable engineering tables.

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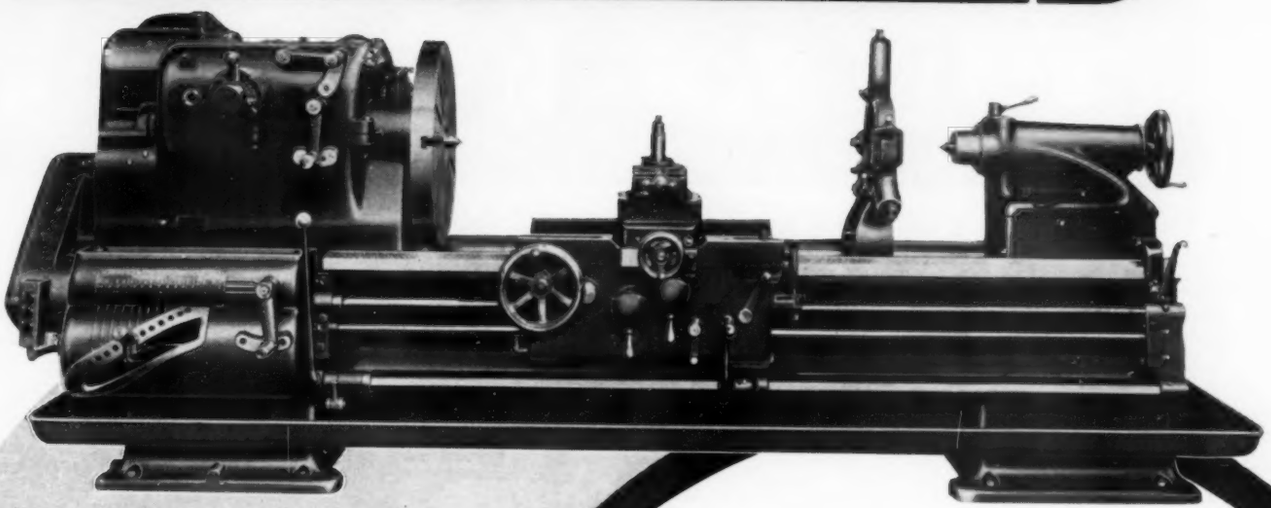
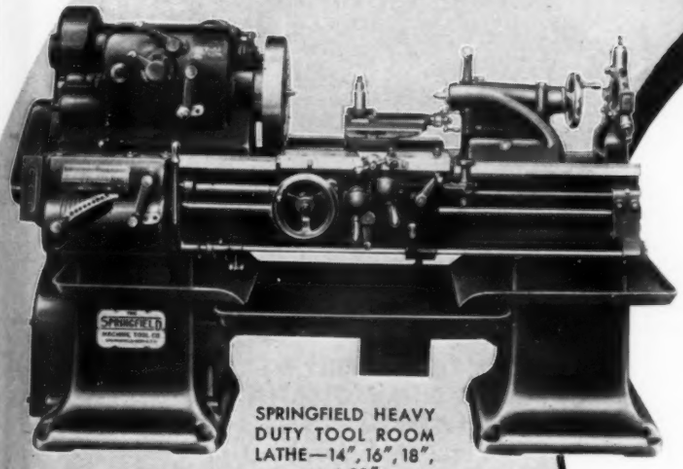
SPRINGFIELD



IELD 24" and 27"
D HEAD LATHE

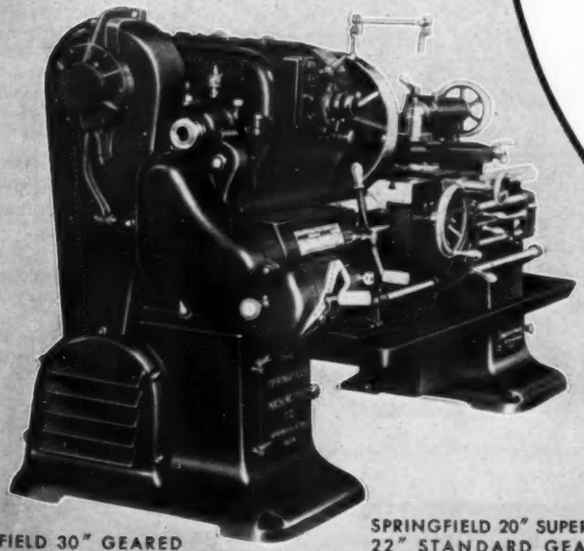


SPRINGFIELD HEAVY DUTY TOOL ROOM LATHE—14", 16", 18", and 20"

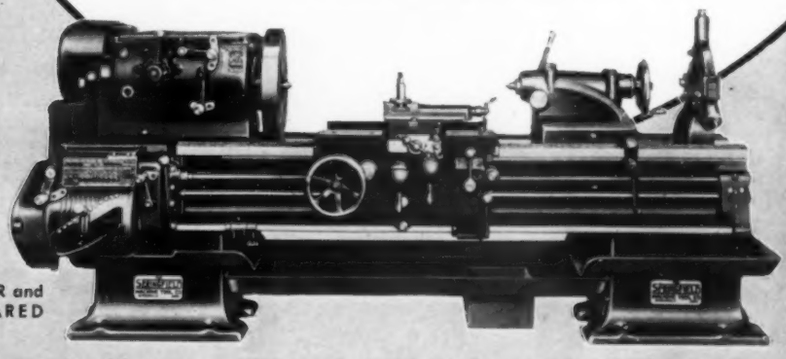
. . . . GEARED HEAD LATHES

Defense production is now *war production* . . . . . and Springfield Geared Head Lathes are continuing to do their share, under these *greater* emergency conditions, *in producing more for less!!*

Make Springfields your choice for metal turning operations. In sizes from 14" to 30", heavy and medium duty, Springfield Geared Head Lathes represent ideal units for direct war output. Write for more detailed data . . . . also information concerning deliveries, etc.



SPRINGFIELD 30" GEARED HEAD LATHE—MEDIUM DUTY



SPRINGFIELD 20" SUPER and 22" STANDARD GEARED HEAD LATHE

The SPRINGFIELD MACHINE TOOL Co.

SPRINGFIELD OHIO U.S.A.

MOREY

ACCURATE · · FAST

MOREY NO. 2G and NO. 3G HIGH SPEED TURRET LATHES

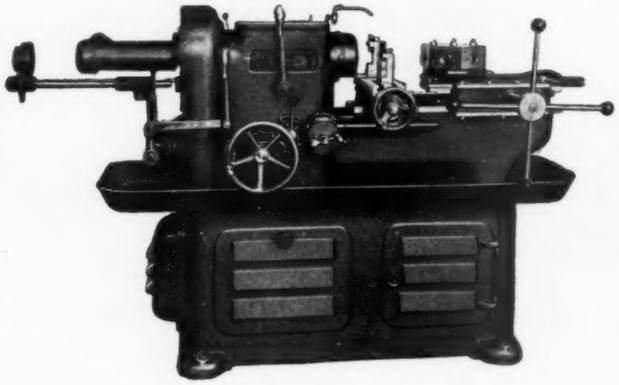
Motor drive. Infinite spindle speeds. Designed for the economical manufacture of small parts from bar stock, second operation and chucking work. Designed for the use of carbide or high speed tools. Main spindle equipped with Timken bearings—all other bearings anti-friction.

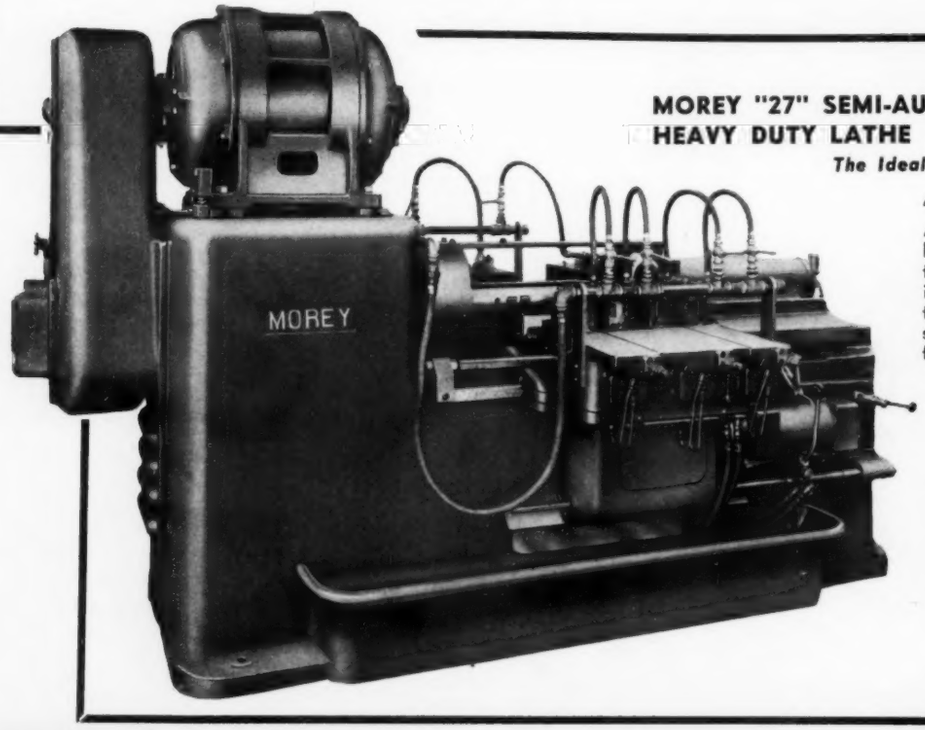
No. 2G—Capacity 1" dia. x 6½" turning length; speeds from 90 to 1800 R.P.M. or 180 to 3600 R.P.M.

Ask for Circular No. 629.

No. 3G—Built in Plain and Universal types. Capacity 1½" dia. x 9" turning length; speeds from 60 to 2100 R.P.M. or 100 to 3600 R.P.M.

Ask for Circular No. 727.





MOREY "27" SEMI-AUTOMATIC HEAVY DUTY LATHE

The Ideal Lathe for Turning Shells

A complete feeding and return cycle.

A single movement of the starting lever starts the spindle revolving and the tools feeding. When the work is completed the tool is returned to the loading position, the spindle stops and the work unloads—ready for removal.

The operator is an attendant—unskilled labor may be employed.

Built for rough and finish turning shells from 105 mm. to 7" in diameter.

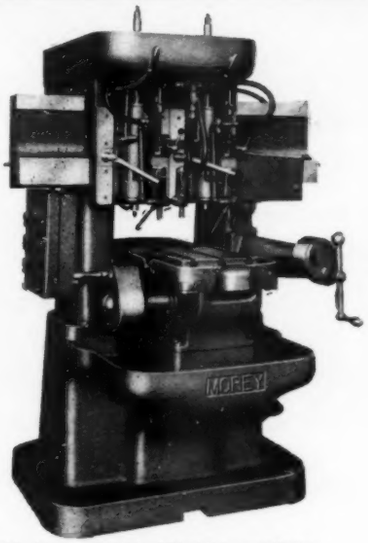
While this lathe was developed primarily for the manufacture of shells, it can be used to advantage on many other types of turnings which can be held in an arbor or chuck.

Ask for Circular No. 715.

MOREY MACHINERY CO.

MACHINE TOOLS
for SPEEDING PRODUCTION IN 1942

CONVENIENT · · POWERFUL



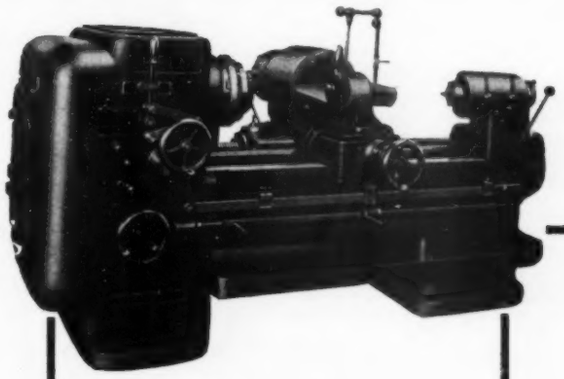
MOREY NO. 12M HIGH SPEED VERTICAL PROFILER AND MILLER

Made in single and double spindle models.

Motor drive. Equipped throughout with preloaded precision bearings. Designed for the economical duplication of small parts requiring accurate interchangeability. Spindle speeds up to 3600 R.P.M.

Unique cross rail design eliminates vibration. Removable spacer permits increased daylight space.

Ask for Circular No. 680.



MOREY THREAD MILLER

For external or internal thread milling. Built in one swing, 12", and in any length bed required.

Ask for Circular No. 728.

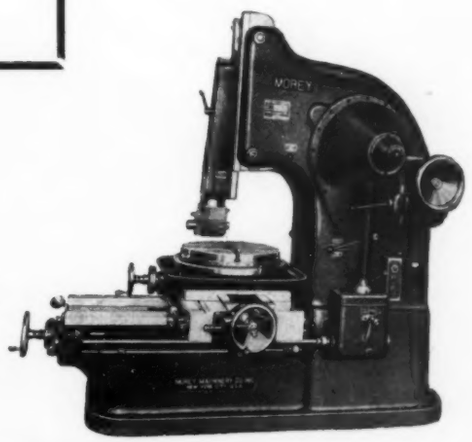
MOREY VERTICAL SHAPERS

Built in two sizes: 8" and 12" stroke.

Timken bearings on main spindle; all other bearings are anti-friction. Features include: directional control; power rapid traverse for all movements; triplex control.

These machines, designed for tool room and manufacturing, are simple, powerful, efficient, convenient and accurate. Equipped with self-contained motor drive.

Ask for circular No. 726.



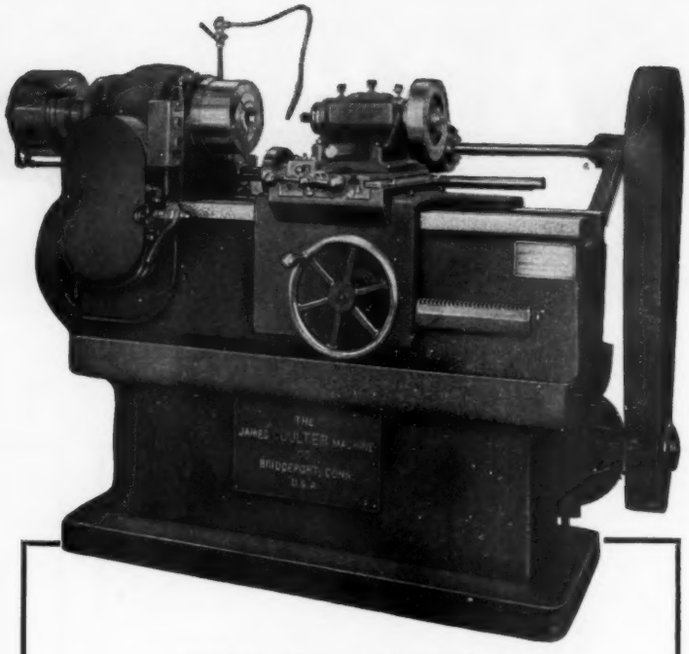
Inc. 410 Broome St., New York, N.Y.

Keep Ahead of
DEFENSE DEMANDS
on the PRODUCTION of
EXTERNAL and INTERNAL THREADS

The Coulter Type "H" Hob Thread Miller—modern in every detail of design and construction—handles high speed, accurate production of right or left hand threads. Any parts that can be held in ordinary chucks, air operated chucks, air operated collet chuck or special face plate fixture can be threaded on this machine.

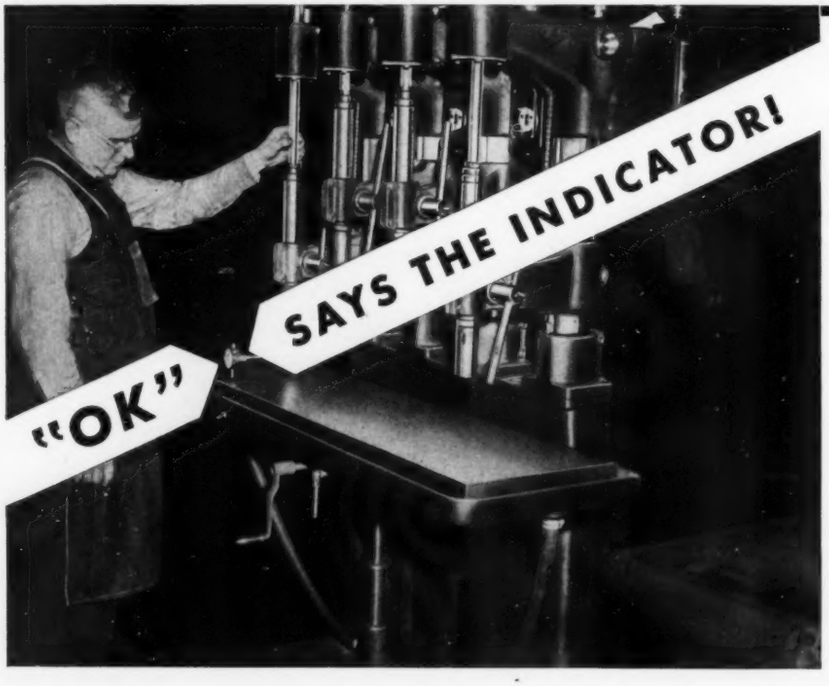
Work holding spindle and cutter spindle are driven by individual motors through worm and gears. Speed changes to work spindle are accomplished by pick-off gears; cutter spindle speeds are controlled by variable motor sheave. All high speed shafts turn in anti-friction bearings.

Maximum external thread, 7"; minimum hole depends on smallest hob practical.



Send for Descriptive Bulletin giving full information.

The James COULTER *Machine Co.*
BRIDGEPORT • CONNECTICUT • U.S.A.



..and another

"Buffalo" Drill

is Ready for Action

Final inspection is the most important step in the manufacture of "Buffalo" Drilling Machines. Spindles are indicated for "runout," sliding heads checked for alignment, table checked for alignment and squareness to the spindle, and the entire machine, as well as individual parts, given a running test for balance and vibration. When the indicator says O. K., it means your machine is ready to serve you either on the heavy service of the production line or the keen precision of the tool room—ready to give you years of efficient, trouble-free service.

"Buffalo" DRILLING MACHINES

BUFFALO FORGE COMPANY
448 BROADWAY, BUFFALO, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VALUABLE AIDS TO INCREASED PRODUCTION

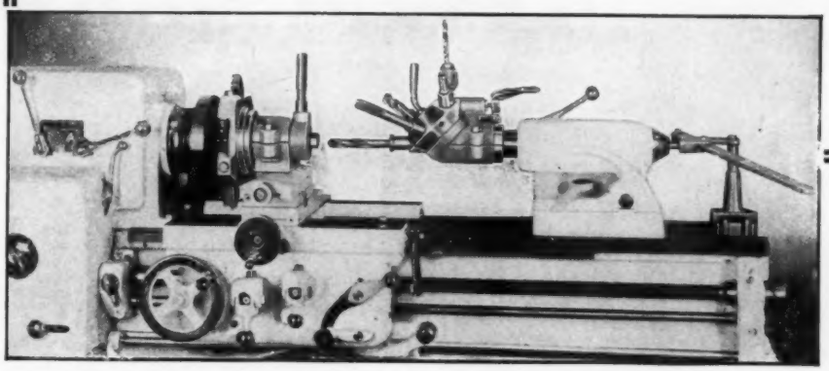


PHOTO OF TURRETS ON 16" LATHE

You can change any engine lathe into a complete, precision turret lathe with the JEFFERSON TOOL-POST TURRET, TAIL-STOCK TURRET and ADJUSTABLE FULL FEED . . . and double its productive capacity.

9 different tools are quickly available for forming, roughing, boring, finishing, kurling, drilling, tapping, etc. without stopping the lathe or changing tools.

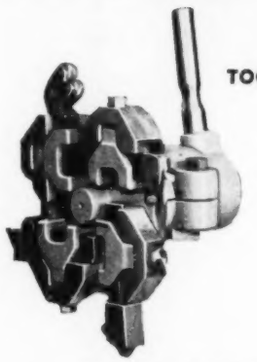
JEFFERSON TURRETS are sturdy precision tools and should not be confused with the small, cheaply made gadgets now on the market.

TAIL-STOCK TURRET accommodates five tools and each tool centers automatically when brought into position by means of an indexing plunger. Made in four sizes to fit small bench lathes up to lathes with 20" swing.

TOOL-POST TURRET carries four separate tools instead of one. Made in two sizes for standard 0, 00; No. 1 and No. 2 tool holders.

ADJUSTABLE FULL FEED eliminates slow movement of tail-stock spindle and provides easy control. For any lathe up to 18" swing.

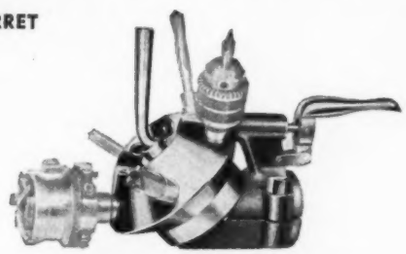
When ordering new lathes, be sure to specify JEFFERSON TURRETS.



4 TOOL—
TOOL POST TURRET

• • •

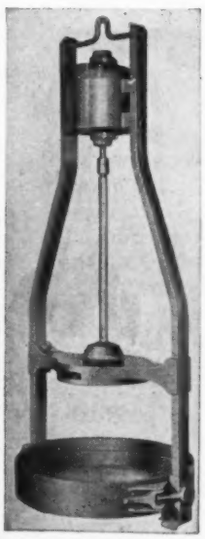
Pats. Pending

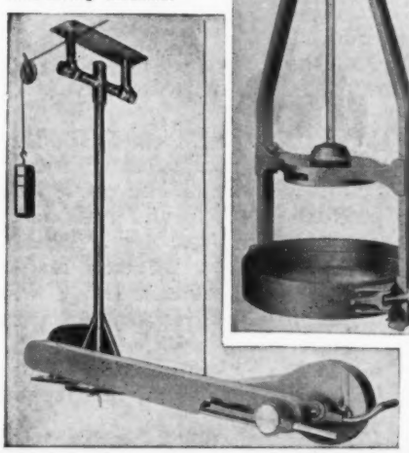


5 TOOL—TAIL STOCK TURRET

JEFFERSON SWING-FRAME GRINDING & POLISHING MACHINES

For wheels up to 14" in diameter. Full universal. Can be swung forward, backward, up, down, right, left. Will grind and clean rough castings of any kind, shape or size. Particularly valuable where many castings per day must be cleaned preparatory to enameling or other finishing. A real time-saving machine.





JEFFERSON GYRATORY FOUNDRY RIDDLE

This riddle weighs only 135 lbs. and is easily portable, yet it efficiently handles fine, medium and coarse dry materials with equal speed and efficiency. 20" dia. sieve. Has a capacity equal to 10 men riddling by hand.

JEFFERSON-PRECISION MILLING MACHINE

(Floor or Bench Type Power Feed or Quick-Acting Hand Feed)

The 4-Speed JEFFERSON MILLING MACHINE is capable of close tolerance . . . proved performance for such operations as die sinking, contour profiling, angular milling, jig boring, routing of ferrous and non-ferrous metals, and practically all other essential milling operations for production line or tool room.

The working surface (14"x4-3/8") of the table of the JEFFERSON MILLING MACHINE has an equal capacity to that of many larger and much higher priced machines and is equipped with three T slots to accommodate standard T bolts for tight clamping of work or fixtures. It is so constructed that it is at all times ready for the application of a variety of standard attachments.

Four spindle speeds—200, 400, 700, 1,000 R.P.M. Write for folder or catalog describing this new machine in detail.

THE JEFFERSON MACHINE TOOL CO.

South Sweeney, Cutter and Fourth Sts.

CINCINNATI, OHIO

Get more machine tools in your present space

as for instance

VERTICAL THREAD GRINDERS

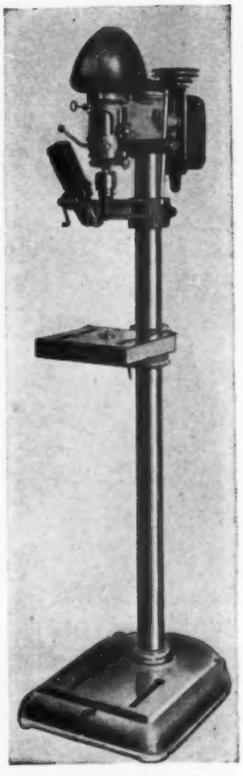
SAVE THIS SPACE

Machine is 39 inches deep, 43 inches wide, and 72 inches high, with extreme operating floor space 39 inches by 48 inches. Shipping weight is approximately 3200 lbs.

with

DALZENS

They do much more and need less floor



Can be changed over in a moment from Center Grinder to Drill Press or vice versa. You simply loosen one bolt and adjust the Center Grinder dresser in or out of position.

With the present tremendous plant expansion programs underway, the item of machine space becomes ever more important. Plant and Tool Engineers are burning "the midnight oil" trying to work the required amount of machine tools into a given amount of floor space.

This is where the Dalzen line of Vertical Thread Grinders plays an important role—accuracy and production combined in a machine tool requiring little more than half the space formerly required for the production of ground threads.

These machines are furnished in two sizes. No. 1 Dalzen which will grind up to 6 inches diameter, 10 inch length threads anywhere on an 18-inch shaft. Dalzen No. 2 will grind a 3-inch diameter, 4 inches in length anywhere on an 8-inch shaft.

We also manufacture the Dalzen Combination Center Lapping Machine and Drill Press which saves the floor space formerly required for two separate machines.

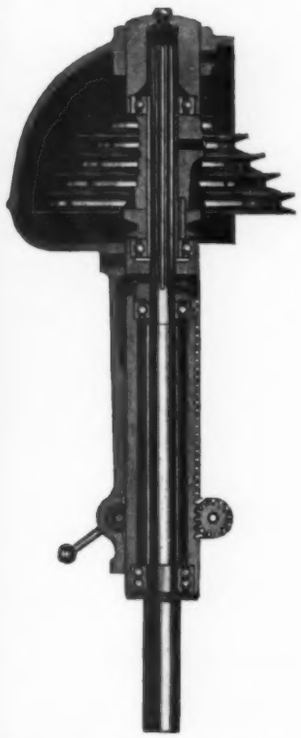
This machine is 38 inches deep, 48 inches wide, and 75 inches high. Extreme operating floor space is 38 inches by 60 inches. Approximate shipping weight, 4400 lbs.

DALZEN TOOL & MFG. CO.
12255 E. 8 Mile Road — Detroit, Mich.

A NEW 20 INCH DRILL PRESS

. . . with smooth, positive POWER FEED

This new Drill Press was designed especially to meet today's extraordinary production needs. Its compact, smooth-acting Power Feed operates through a clutch and can be engaged at any point, regardless of spindle position. Unusually well balanced, it operates with equal precision at speeds as low as 260 r. p. m. and as high as 5200 r.p.m., drilling holes from 1/16" to 1". Study the quality features described in the drawing at extreme right and in specifications below - then mail the coupon for further details.



The solid head casting is precision-bored to fit the machined column and quill. Four precision deep-groove ball bearings assure smooth, frictionless operation of spindle. Bearing *above* and *below* the straddle-mounted pulley take the belt strain evenly, preventing whip.

SPECIFICATIONS

CAPACITY–Drills to center of 20" circle. Feed 6". Drills 3/4" hole in steel, 1" in cast iron.

SPINDLE SPEEDS–With 1140 r.p.m. motor: 260, 520, 800, 1200, 1700 r.p.m. With 1740 r.p.m. motor: 400, 800, 1200, 1800, 2600 r.p.m. With 3450 r.p.m. motor: 800, 1600, 2400, 3600, 5200 r.p.m. Special 2-speed motor also available for 3-phase only.

OVERALL DIMENSIONS – Head, front to back, with guard 32". Width 14". Column 3 3/4". Height (Floor Model) 74". Table working surface 14" x 18".

POWER FEED–Available with or without power feed. This unit, powered from drill press spindle, has positive clutch and sensitive automatic trip and return. Four feeding speeds: .003", .006", .009", .012" per spindle revolution. Positive depth stop.

MODELS–Single and multiple spindle models available with or without power feed. Single spindle drill presses also available with foot feed.

WALKER-TURNER COMPANY, INC.
4440 Berckman St., Plainfield, N. J.

Send complete specifications and description at once.

Name .....

Position .....

Company .....

City ..... State .....

walker-Turner
COMPANY, INC.
PLAINFIELD, N.J.
U.S.A.

WALKER-TURNER MACHINE TOOLS
FOR METAL, WOOD AND PLASTICS

DRILL PRESSES · BAND SAWS · BENCH SAWS · TILTING ARBOR SAWS · LATHES
JIG SAWS · RADIAL SAWS · RADIAL DRILLS · BELT AND DISC SURFACERS · JOINTERS
SPINDLE SHAPERS · GRINDERS · FLEXIBLE SHAFT MACHINES · CUSTOM BUILT MOTORS

POPE-SKF PRECISION GRINDER SPINDLES

Continuous fine grinding and long bearing life . . . assured by sealed-in permanent supply of lubricant

SAVE HOURS NOW!

Where the metal working industry worked toward DOLLAR-SAVINGS yesterday, the big job today is to save HOURS. However, you can save both DOLLARS and HOURS TODAY AND TOMORROW by equipping your surface grinders, tool and cutter grinders and similar machines with POPE-SKF SPINDLES.

Sealed-in lubrication prevents lubricant getting out or dirt getting in, assuring long-lived accurate grinding service without attention. No time is lost in warming up because POPE-SKF SPINDLES run at temperatures only about 30 deg. above room temperature. The use of SKF machine tool bearings assures the maximum in rigidity, accuracy, load carrying capacity, speed range and service life.

QUICKLY AND EASILY APPLIED TO YOUR MACHINES

The POPE-SKF spindle is a complete package unit ready to slip into your machine tool and use immediately. These spindles are available as regular equipment on most well-known grinders. Hundreds are in service producing excellent grinding finishes that meet the most critical and exacting demands.

Investigate Now!

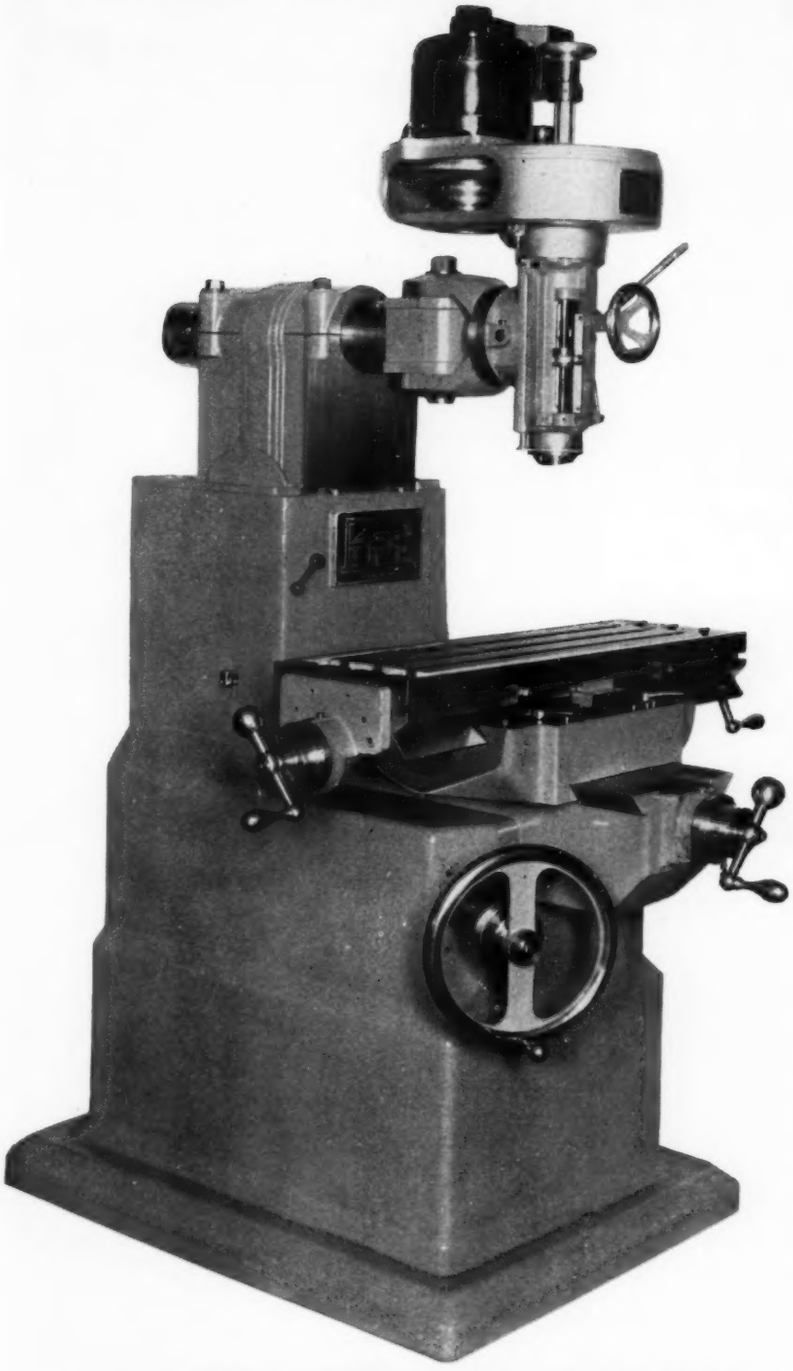
You are invited to look into the advantages assured by the use of POPE-SKF PRECISION GRINDER SPINDLES on your own machines. Write at once for complete details.

POPE MACHINERY CORPORATION

261 RIVER STREET **HAVERHILL, MASS.**

Machine tools and precision grinder spindles

THE POPE MILLING MACHINE
with high speed universal head



This is a new machine designed to handle heavier work than ordinarily done on this class of millers. To this end it is made extra heavy and rigid. This extra rigidity adapts it also for much of the more critical work usually done on more expensive millers.

MACHINE FEATURES

Massive base. Knee and base are one solid casting. 4½" overarm mounted in heavy column having a 21" bearing in base. Jig borer construction. Table always at same height for maximum convenience.

HEAD FEATURES

Head fully universal. Head angular adjustments are quickly and rigidly locked by single bolt. Degree scales are extra large, 5" and 6", for quick and accurate settings. Balanced spindle for full sensitivity. Extra large pulleys for full power transmission. Belt tension instantly released and re-set by single control for speed change.

✦

The spindle is rugged and is mounted on two preloaded pairs of large size high precision machine tool ball bearings.

The spindle pulley is mounted on an extra heavy preloaded pair of ball bearings entirely independent of the spindle bearings, thus insuring that belt pull can cause no deflection of the spindle.

Spindle and pulley bearings are all permanently lubricated and sealed so that no attention from the operator is required.

✦

Specifications

Longitudinal table travel	20"
Cross feed travel	10"
Spindle travel	4"
Vertical travel of column	15"
Maximum distance spindle to column	18"
Maximum distance spindle to table	19"
Size of table	10" x 32"
Thickness of table	4¼"
Spindle capacity	#9 B & S

Hand wheel and lever feed

Weight complete, approximately 2750 lbs. Two speed ranges are available:—250 to 3000 R.P.M., and 375 to 4500 R.P.M.

WRITE FOR COMPLETE INFORMATION

POPE MACHINERY CORP., Haverhill, Mass.

MACHINE TOOLS AND PRECISION GRINDER SPINDLES

Your Product, too!

WHATEVER THE SIZE △ □ ○ WHATEVER THE SHAPE

MARKED *and Knurled*

★ BETTER
★ FASTER
★ CHEAPER

Shells may be out of your line. But whatever you make, Noblewest high speed precision marking equipment will mark it quickly, accurately, dependably—the way it marks shells, fuses and a thousand and one other products for U. S. arsenals and cost-conscious manufacturers. Write today for information on how Noblewest can speed your marking, cut your costs.

NOBLE AND WESTBROOK MANUFACTURING CO.

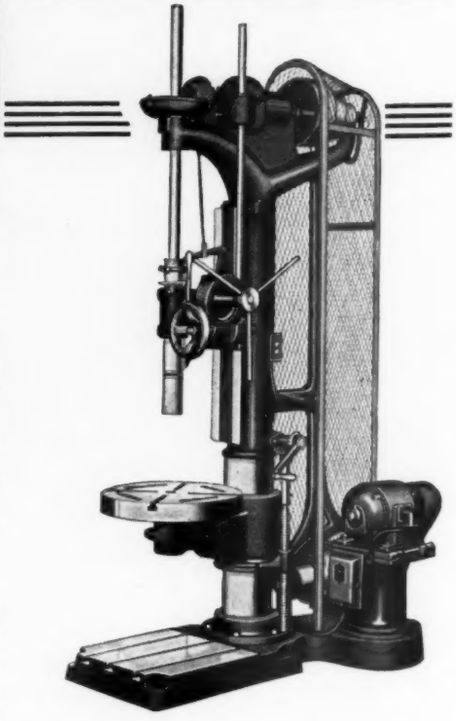
Marking Specialists Since 1904

EAST HARTFORD ★ CONNECTICUT

MARK IT BEST WITH NOBLEWEST ➡ NOBLEWEST IMPROVED MARKING DEVICES

PROMPT DELIVERY

ON *Sibley* 24" SLIDING HEAD DRILLING MACHINES



● Increased production facilities and manufacturing economies now permit shipment of Sibley sliding head drill presses without delay. These are standard models, designed and built with the accuracy and power to meet modern production requirements. Available in 24" and 28" swing; with round or square table; coolant pump; mechanical tapping attachment; V-flat motor drive or geared motor drive. See these on display at your dealer or write today for complete information.

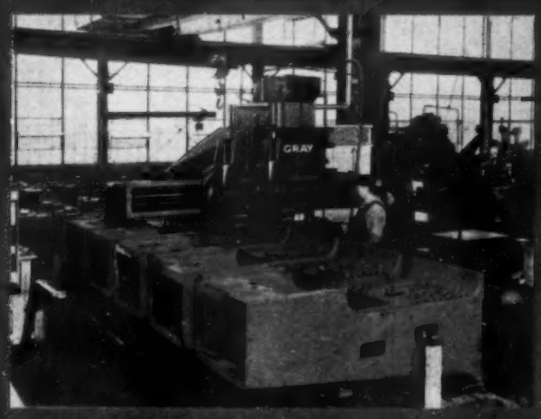
DEALERS

Atlanta, Ga. — R. S. Armstrong & Bros. Company	Melbourne, Florida — William Rath
Boston, Mass. — Lynd Farquhar Company	Milwaukee — E. L. Essley Machinery Company
Buffalo, New York — R. L. Crane Company	Montreal, Canada — Moore Bros. Mach. Co., Ltd.
Chicago, Ill. — E. L. Essley Machinery Company	New Orleans, La. — Murray Baker Frederic, Inc.
Cleveland, Ohio — Reynolds Machinery Company	New York, N. Y. — Vandyck Churchill Company
Dallas, Texas — Hamilton-Huster Mach. Company	Philadelphia, Pa. — Swind Machinery Company
Dayton, Ohio — G. H. Gosiger Machinery Company	Pittsburgh, Pa. — Barney Machinery Company
Denver, Colo. — Mine & Smelter Supply Company	Portland, Oregon — Portland Machinery Company
Detroit, Mich. — James W. George Mach. Company	Richmond, Virginia — Smith-Courtney Company
Houston, Texas — Westendorff, Nelms & Company	San Francisco, Cal. — Machinery Sales Company
Kansas City, Mo. — English Bros. Mach. Company	St. Louis, Mo. — McDonald Mach. Company
Los Angeles, Cal. — Eccles & Davies Mach. Company	Syracuse, N. Y. — J. F. Owens Mach. Company

SIBLEY MACHINE & FOUNDRY CORP. 30 EAST TUTT STREET, SOUTH BEND, INDIANA

MANUFACTURERS OF UPRIGHT DRILLING MACHINES FOR 65 YEARS

...GRAY



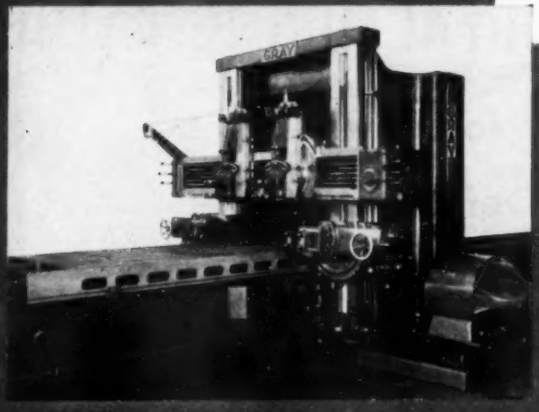
Openside Planer

PLANERS

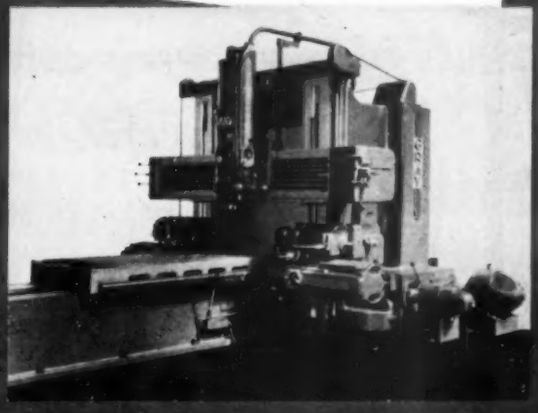
*MILLING PLANERS

MILLING MACHINES (PLANER TYPE)

*HORIZONTAL BORING MACHINES (FLOOR TYPE)



Double Housing Planer

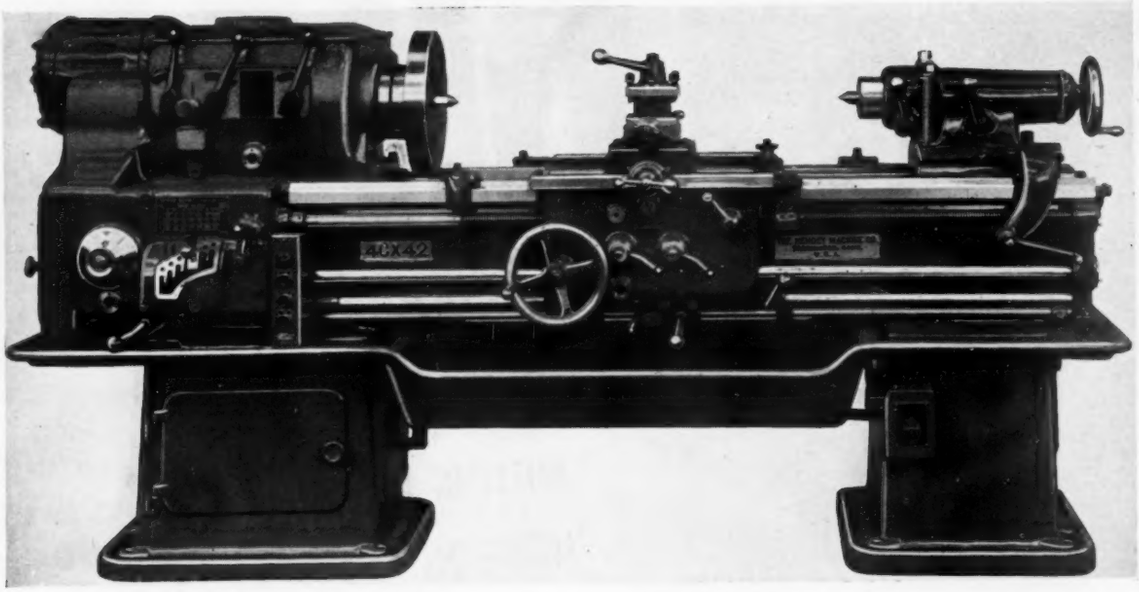


Planer Type Milling Machine

*We feel that by concentrating our entire efforts on two types of machine tools, we can best serve the Defense Program. We have therefore temporarily withdrawn from the market our Horizontal Boring Machines and Milling Planers.

The G. A. GRAY COMPANY, CINCINNATI, O.

HENDEY



4C HEAVY DUTY MANUFACTURING LATHE

Meets every demand for power, speed and productivity on Defense Work . . .

Built for today's maximum requirements in efficiency, convenience, accuracy and speed, the HENDEY No. 4C HEAVY DUTY MANUFACTURING LATHE is playing an important part in many shops busily engaged in the production of defense necessities.

This HEAVY DUTY HENDEY Lathe—with 12 spindle speeds from 30 to 1200 RPM and with automatic lubrication to apron, carriage and cross slide—is contributing much to the tremendous overall productivity which machine tools in general are achieving in the present national emergency.

THE HENDEY MACHINE COMPANY

TORRINGTON • • • • CONN. • • • • U. S. A.

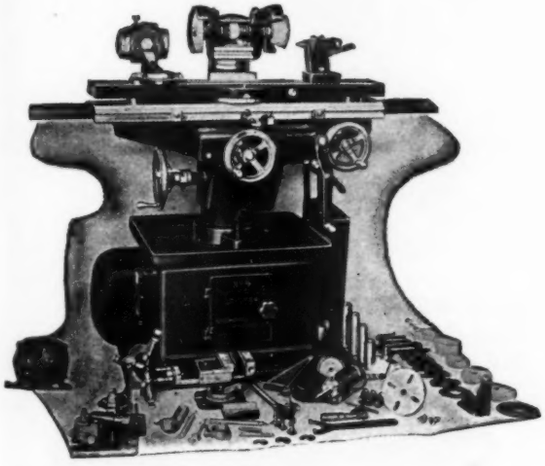
GRAND RAPIDS

for EVERY GRINDING NEED

DRILL and TAP GRINDING

Longer life for your drills and taps! More accurate holes with less frequent regrinding! These are the means to increased production and important tool economies. Grand Rapids Drill and Tap Grinders automatically grind correct angles on drills of all sizes, producing a drill point correctly centered, with gradually increasing clearance that cuts faster and more easily. Heavy column and stand construction, oversize wheel flanges, precision ground spindle with dust-proof bearing mount — all contribute to continued accuracy. Write for descriptive bulletin.

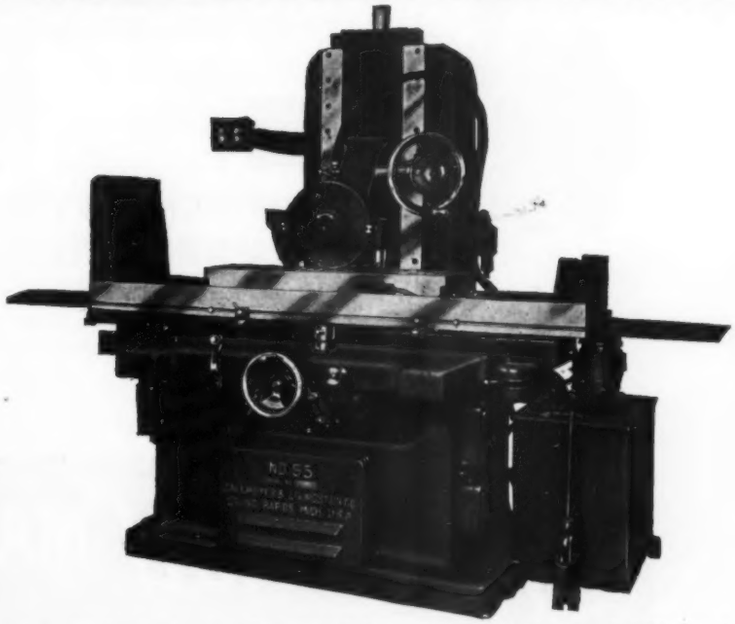
TOOL and CUTTER GRINDING



One machine for grinding gear cutters, formed cutters, angle cutters, face mills, end mills, side mills, spiral and plain milling cutters, thread chasing tools, reamers, hobbs, etc. . . . for performing internal and surface grinding on precision toolroom jobs. Grand Rapids Universal Tool and Cutter Grinders enable you to keep all your tools perfectly sharpened and thereby get longer service, more accurate results and higher production. Let us send you full details of this versatile machine—virtually a complete tool sharpening department in itself.

HYDRAULIC FEED SURFACE GRINDER for

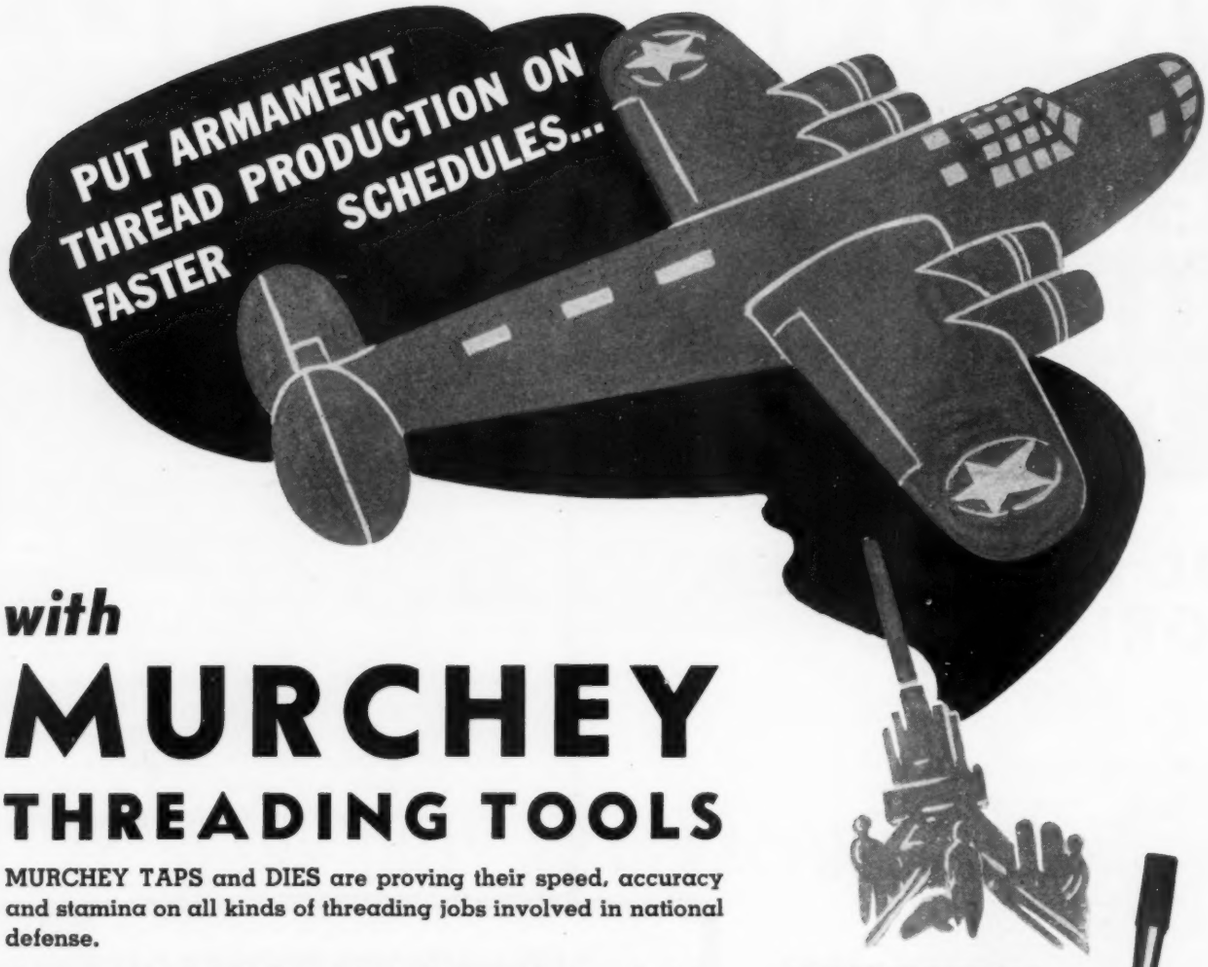
TOOLROOM and PRODUCTION GRINDING



Massive, one piece column and base insure maximum rigidity and permanent alignment . . . Patented vernier control of elevating mechanism, graduated in .0001", splits tenths easily, even on production jobs. Hydraulic feed eliminates all gears in longitudinal and cross feed—produces smoother work, free from gear marks. Two spindle speeds make it possible to save and use worn wheels. Write for Catalog G-L-100, describing this No. 55 Grinder, as well as larger and smaller models from the complete Grand Rapids Line.

GALLMEYER & LIVINGSTON CO.

300 STRAIGHT AVE., S.W.
GRAND RAPIDS, MICH.



with

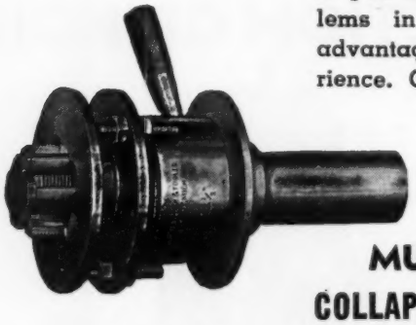
MURCHEY

THREADING TOOLS

MURCHEY TAPS and DIES are proving their speed, accuracy and stamina on all kinds of threading jobs involved in national defense.

Armament work is being rushed along on faster schedules through the use of Murchey Threading Tools.

If you are facing threading problems in your production, take advantage of Murchey's long experience. Consult Murchey NOW!



MURCHEY TYPE "M" COLLAPSIBILE MACHINE TAP

The Type "M"—designed for fast, accurate thread production—provides instant, positive collapse and accurate thread lengths. It is adjustable for thread size. Sturdiness, strength, speed and dependability, are assured by the Type "M".

MURCHEY TYPE "G" SELF-OPENING DIE HEAD

This non-rotating, self-opening die head—for use on hand screw machines—can be depended on for long-run production of fine quality threads. It is fast, accurate and long lived. Head is hardened and ground; opening is positive and instantaneous; closing is by hand. Adjustable for size, the Type "G" will speed up thread production on a wide variety of work.

MURCHEY ALSO MANUFACTURES

Thread Milling Machines, Shell Tapping Machines and Roller Pipe Cutting Off Machines, all types of Die-heads and Collapsible Taps.

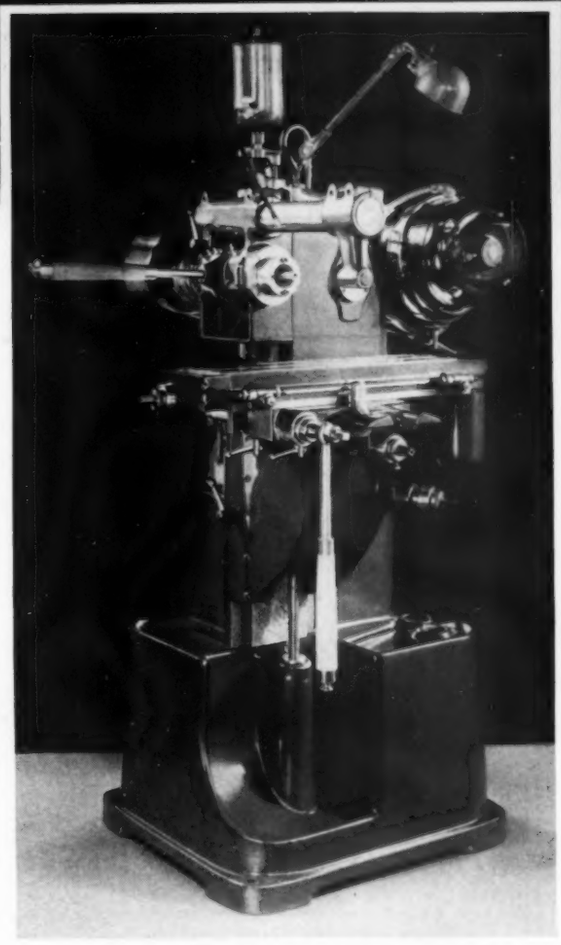
Murchey **MACHINE & TOOL CO.**

.....DETROIT, MICHIGAN

★ Speed small parts production in 1942

on the

FAST, ACCURATE NICHOLS HAND MILLING MACHINE



With this modern, precision machine tool you can be assured of fast, close work at low cost.

The "Nichols" is a truly high production milling machine on which a wide variety of operations can be handled at high speed. In it are combined the usual conventional features of the hand miller with a rugged construction and inbuilt accuracy which elevates this machine to a place among modern high production tools.

In your shop as in many others there are milling operations that can be handled faster on the Nichols Hand Miller than on a power machine because of the high cutting speeds and exceptional operating conveniences available. Easy set up and maintained precision makes the Nichols an ideal machine for tool room service.

OUTSTANDING FEATURES

COLUMN—of one-piece box section with broad, adequate slides for head and knee cast integral; column is securely bolted to base.

KNEE—of heavy box section with extremely long dovetail slides for vertical adjustment on column.

SADDLE—of semi-steel and of generous size to support table to knee.

TABLE—fitted with oil pockets at either end and with a 5/8" T-slot; table can be operated from either side of machine.

VERTICAL HEAD—a rigid, well ribbed casting with broad long slide; can be operated by hand and locked in any position; fitted with hand set depth stop.

SPINDLE—hardened and ground and carried on Timken Precision Roller Bearings with wide center spacing for adequate support and high spindle speeds.

DRIVE—through double V belt and designed so that constant center distance is maintained between motor and spindle regardless of position of head without use of idler or belt tensioning device.

Investigate the productive possibilities of the "NICHOLS" today!

CONDENSED SPECIFICATIONS

Longitudinal feed—10"

Transverse Feed—7"

Vertical Feed of Knee—13½"

Vertical Movement of Head—4½"

Spindle Speeds—100, 200, 600 and 1200 R.P.M.

Working Surface of Table—6½" x 21"

Floor Space—39" x 33"

Height—62"

W. H. NICHOLS & SONS WALTHAM, MASS., U.S.A.

REID
SURFACE GRINDERS

Illustrated is the Model 2-B Power feed, all electric, reversible motor for cross feed and longitudinal feed. Motorized, belt, ball bearing or SKF Roller Bearing spindles — capacity 6" × 18". Also two companion models: No. 2-A Hand or Mechanical feed, 6"×18"—phosphor bronze bearing spindle; and No. 2-C Hand feed, 6" × 18" — with motorized, belt or SKF Roller Bearing Spindles.

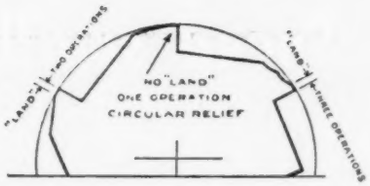
••• —— V for victory—the complete dependability of Reid Surface Grinders has a lot to do with Victory. Applied to Defense Production and Toolroom jobs, the Model 2-B (and companion models described above) satisfies fully all possible grinding requirements within the 6" x 18" capacity. The sustained accuracy of these Grinding Machines is an outstanding asset of immeasurable Value. Excellent deliveries when priority certificates are attached to orders. Send for descriptive literature to Dept. E.

EXCLUSIVE SALES REPRESENTATIVE

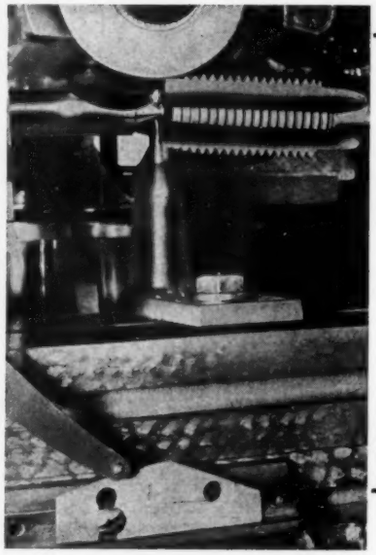
H. LEACH MACHINERY CO.

387 CHARLES ST., PROVIDENCE, R. I., U. S. A.

DISTRIBUTORS IN ALL PRINCIPAL CITIES



SHOWING HOW CIRCULAR RELIEF GRIND DIFFERS *from* CONVENTIONAL GRIND



ONE MACHINE
• • •
ONE SET-UP
• • •
ONE OPERATION
• • •

You dress the outside of the wheel concavely to exactly the same curve as the tool to be ground. Then offset the tool from center of the curve of the wheel to give desired clearance. Grind clear to the cutting edge. This method of grinding leaves all possible metal behind cutting edge giving maximum support and longer tool life.

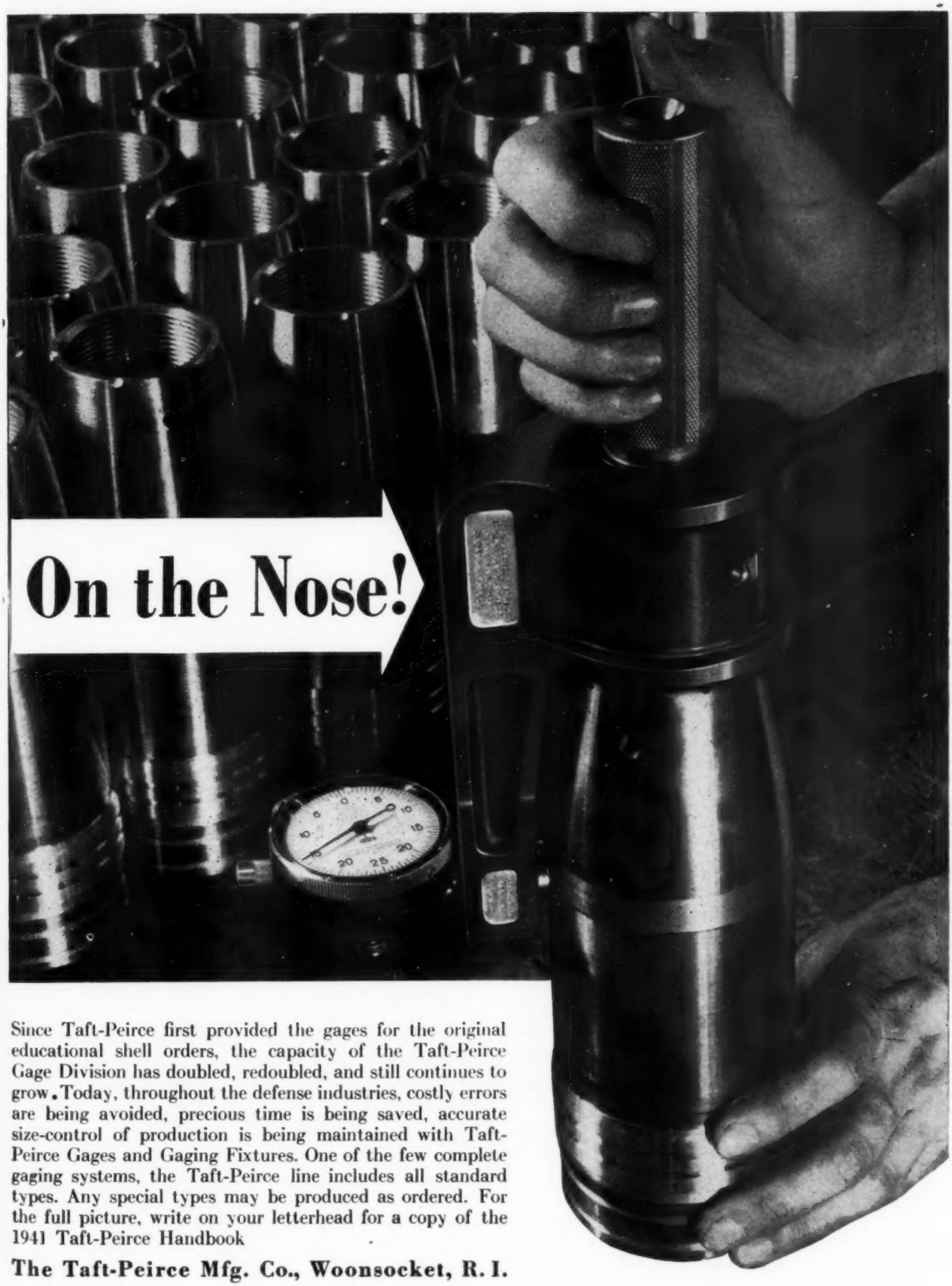
Maximum swing on centers 7" — Floor space 2 ft. x 6½ ft.— Weight 600 pounds— Maximum table travel 26" — Standard motor 110 V-60 cycle single phase.

ADVANTAGES

Increased Production
Lower Unit Cost
Closer Tolerances
Exact Duplication
Longer Life Tools
More Pieces per Grind

THE CLEVELAND TOOL ENGINEERING CO.

9201 DETROIT AVE. CLEVELAND, OHIO



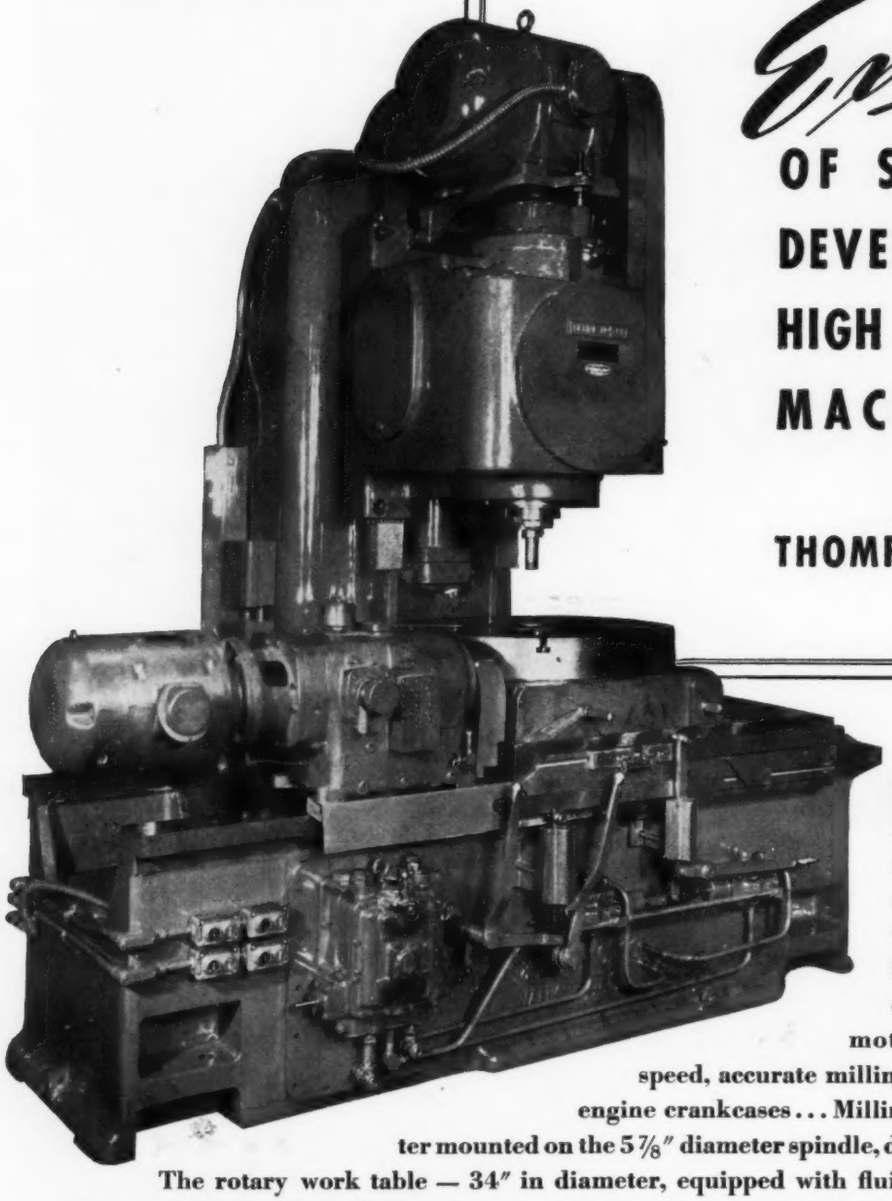
On the Nose!

Since Taft-Peirce first provided the gages for the original educational shell orders, the capacity of the Taft-Peirce Gage Division has doubled, redoubled, and still continues to grow. Today, throughout the defense industries, costly errors are being avoided, precious time is being saved, accurate size-control of production is being maintained with Taft-Peirce Gages and Gaging Fixtures. One of the few complete gaging systems, the Taft-Peirce line includes all standard types. Any special types may be produced as ordered. For the full picture, write on your letterhead for a copy of the 1941 Taft-Peirce Handbook

The Taft-Peirce Mfg. Co., Woonsocket, R. I.

Use Taft-Peirce Gages for Every Gaging Need

• Davis Rotomatic Open Vertical Type Milling Machine with Rotary Table



. . . ANOTHER *Example*

OF SPECIALIZED DEVELOPMENT OF HIGH PRODUCTION MACHINERY BY

DAVIS & THOMPSON COMPANY

•

DESIGNED and built with many unusual features of control and performance, this Davis Rotomatic special, vertical-type miller was developed for a large automotive company — for high speed, accurate milling of the inside of airplane engine crankcases . . . Milling is done with a form cutter mounted on the 5 7/8″ diameter spindle, driven by a 20 HP. motor . . . The rotary work table — 34″ in diameter, equipped with fluid drive — has rotary feed with a range of ½″ to 4″ per minute . . . Feed table and spindle head hydraulically operated; the cycle of the machine is semi-automatic . . . Write for complete information on this and other Davis Rotomatic machines for high production.

DAVIS & THOMPSON CO., *Milwaukee, Wisconsin, U. S. A.*

DAVIS ROTOMATIC

HIGH PRODUCTION MACHINERY

Reciprocating

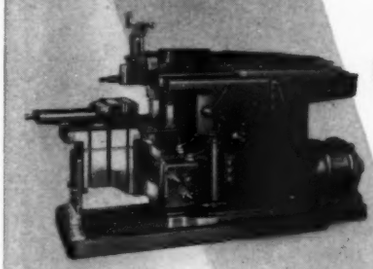
Hy-Draulic

Machine Tools

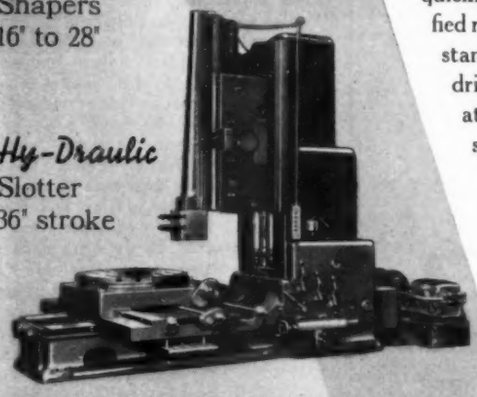
Valuable Aids To Production

Hy-Draulic Machine Tools have exclusive features which make them unusually valuable aids to victory in the battle for maximum production, quality, and economy. The Hy-Draulic drive maintains uniform pressure and speed throughout the cutting stroke. It applies power smoothly, directly, efficiently; works cutting tools to full capacity. Hy-Draulic feeds; like the cutting speeds; are "stepless", can be adjusted quickly to any desired rate whatever in specified ranges. Hy-Draulic Machine Tools use standard constant-speed motors in main drives; are notable for accuracy, operating convenience, power, rigidity, strength and durability. Day and night, we are building Hy-Draulic Machine Tools as fast as it can be done right.

Investigate. Write, today, for illustrated bulletins with complete information and specifications. See your local dealer about prices, priorities, and shipments.

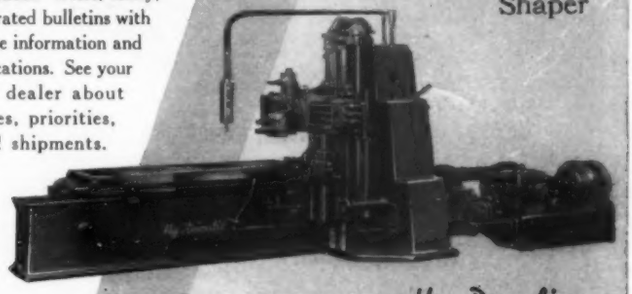


Hy-Draulic Shapers 16" to 28"

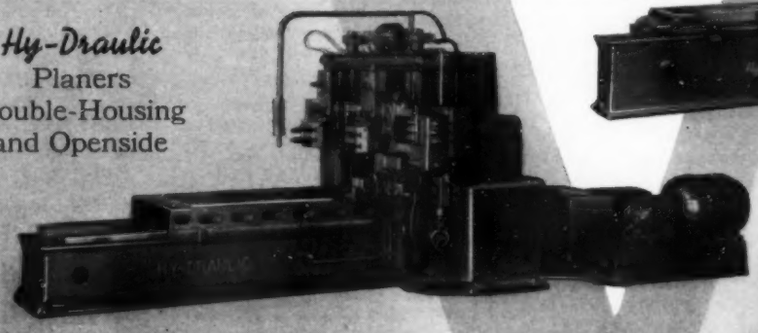


Hy-Draulic Slotter 36" stroke

36" Openside *Hy-Draulic* Shaper



Hy-Draulic Shaper-Planers 66" to 144" stroke



Hy-Draulic Planers Double-Housing and Openside

Hy-Draulic

Reg. U. S. Pat. Off.

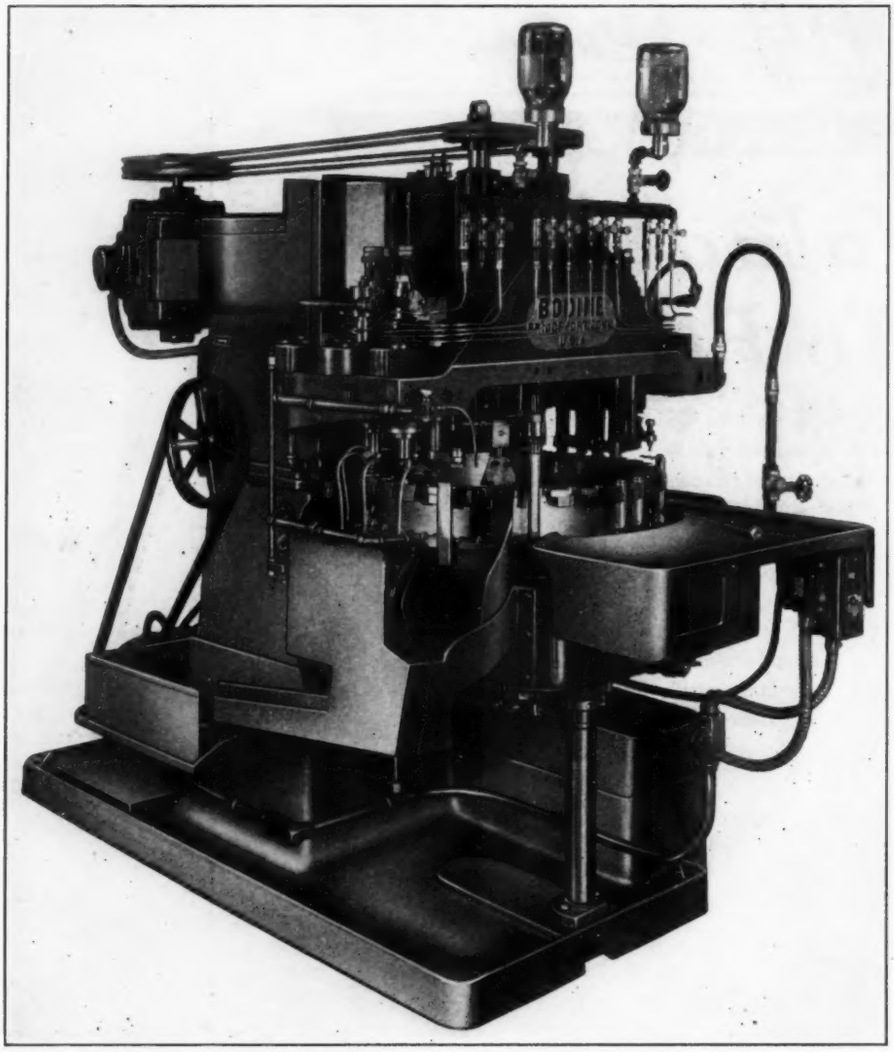
Shapers..Planers..Slotters..Shaper-Planers

ROCKFORD MACHINE TOOL CO.

ROCKFORD, ILLINOIS, U.S.A.

HIGH SPEED REPETITIVE PRODUCTION METHOD

especially adapted to production of ORDNANCE MATERIAL



Bodine 42-30 Dial Feed Type Drilling Machine

BODINE

AUTOMATIC DIAL FEED TYPE

DRILLING, MILLING TAPPING AND SCREW INSERTING MACHINERY

●

The machine illustrated, with guards removed, is equipped with eight high speed drilling spindles on the main slide, tooled to drill flame holes (.041 diameter) in 20 mm. cartridge cases.

Material is drawn brass with low machinability. Parts are hand loaded, two pieces per stroke, and automatically ejected. Electric inspection gauges inspect for presence of hole only (not size). If hole is not drilled through, due to drill breakage, machine is automatically stopped.

Similar machines have been tooled for drilling and tapping time-fuse bodies, cartridge containers, boosters and many other ordnance components.

Specially designed jigs and fixtures developed by our engineers, some features protected by patents, make possible precision production at high speed of a wide range of machine and tool parts.

We will be glad to make recommendations on your blue prints, sketches or samples.

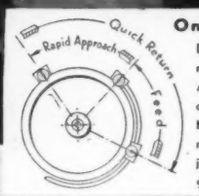
GENERAL DATA ON BODINE MACHINES

Machine No	48–30	48–20	42–30	42–20	41–20	40–10
Capacity in mild steel	Two ½" taps	Two ½" taps	Two ⅜" taps	Two ⅜" taps	Two ¼" taps	Two ¼" taps
Capacity in mild steel	Six ½" drills	Six ½" drills	Six ½" drills	Six ½" drills	Four ¼" drills	Four ¼" drills
Diameter of knee	32"	24"	32"	24"	24"	16"
Diameter of dial	26"	18"	26"	18"	18"	11"
Maximum vertical stroke	3½"	3½"	3"	3"	1"	13/16"
Normal size main motor	3 hp.	3 hp.	2 hp.	2 hp.	1 hp.	¾ hp.
Approximate weight	5500 lbs.	5000 lbs.	4800 lbs.	4500 lbs.	1200 lbs.	800 lbs.
Floor space, maximum — Length	96"	84"	90"	78"	72"	60"
Floor space, maximum — Width	90"	84"	90"	84"	60"	54"

The BODINE CORPORATION

BRIDGEPORT **317 Mountain Grove Street** **CONNECTICUT**

Engineered Production



One of the Reasons

Diagram at left shows one of many reasons for Sundstrand Automatic Lathe speed of operation and change-over. No cycle-control cams to make or mount, merely adjust dogs on convenient graduated disc.

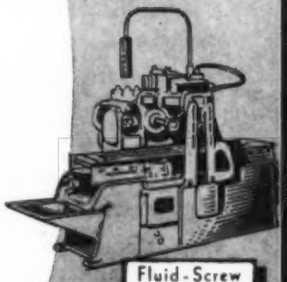
No 00 Rigidmil

No. 0 Rigidmil

No. 1 Rigidmil

Get This Bulletin

Learn quickly about advantages, features, cycles, and specifications of Sundstrand Automatic Lathes by reading bulletin shown above. Write for Bulletin A 391.



Fluid-Screw Rigidmil

How to Increase Production On Aircraft Engine Parts

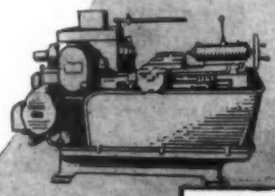
Use Sundstrand Engineered Production . . . it has increased output on parts for aircraft engines, and many other products.

Fast Turning Simplified . . . In example shown above, former time of 9.7 minutes for turning operations on tough steel impeller shafts is cut to 3 minutes by Sundstrand Automatic Lathe. Governed by easily adjusted dogs the automatic operating cycle contributes largely to this 69% increase. Machine works high-speed cutting tools to capacity . . . operator simply starts the cycle, and changes work-pieces after automatic stop.

Quick Change-Over . . . Sundstrand Automatic Lathe photographed was running on a lot of 200 impeller shafts. Changing over to production on any of more than 50 other parts turned on this machine takes only 20 to 25 minutes.

Savings . . . Equally effective on long and short runs, Sundstrand Automatic Lathes save on initial investment, set-up time, running time, operating skill and energy. They speed production on present requirements, have large potential value for future commercial manufacturing.

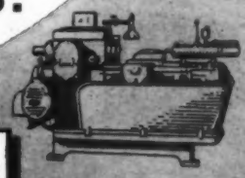
Use This Service . . . Save time and money. Let Sundstrand Engineered Production Department suggest most effective applications of Automatic Lathes for your turning . . . and Rigidmils for your milling. Plan now for future deliveries.



Model 12 Automatic Stub Lathe

Sundstrand Machine Tool Co.

2533 Eleventh Street, Rockford, Illinois, U. S. A.



Model 10 Automatic Stub Lathe

Model 8 Automatic Stub Lathe

In their respective fields, Sundstrand machine tools are unexcelled for high production, accuracy, and lasting value. Write for complete details.

RIGIDMILS · STUB LATHES

Hydraulic Operating Equipment — Drilling and Centering Machines

3 NEW McGRAW-HILL HANDBOOKS of interest to product engineers

AMERICAN MACHINISTS' HANDBOOK

Think of being able to find the answer — the *right* answer — to any question — quickly — layouts, feeds, speeds, tools, jigs, fixtures, materials, standards, tolerances — any detail of machine shop or drafting room practice. In one book that will fit into your pocket this Handbook fills all practical reference needs. The Handbook enables you to go ahead at any time, knowing that you are right, with the wealth of expert evidence in the handbook behind you — a service worth many times the cost of the Handbook in time, trouble, and wastage saved.

By Colvin and Stanley. 1350 pages, 4 x 6½, over 2500 illustrations and tables. $4.00

MATERIALS HANDBOOK

By George S. Brady, formerly Technical Adviser to the U. S. Coordinator for Industrial Purchasing. 591 pages, 6x9, $5.00.

In Brady's MATERIAL HANDBOOK you will find just the facts you want — to enable you to face the task of estimating, specifying, and purchasing, more easily, more intelligently, more economically. More than 5000 materials are covered — metals, woods, industrial fabrics, chemicals used in industry, useful minerals, ceramics, paints, resins, etc. Each material is covered with regard to relative quality, composition, strength, weight,—whatever facts are necessary to give a quick, practical, and authoritative picture of the place of the material in industry. A desk tool of constant usefulness to all who deal with, specify, or purchase materials.

MECHANICAL ENGINEERS' HANDBOOK

Edited by LIONEL S. MARKS
Gordon McKay Professor of Mechanical Engineering, Emeritus, Harvard University

- 2276 pages of descriptions, data, and diagrams to aid engineers, technical men, and students in the solution of mechanical engineering problems.
- The contributors number more than 100 engineers and specialists, to assure you the most authoritative and dependable information on problems of design and practice.
- Largely rewritten, fully revised, chock-full of the most useful and up-to-the-minute data — a 1941 tool for engineers.
- Priced the same as earlier editions, $7.00.

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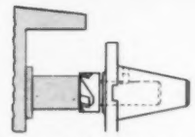
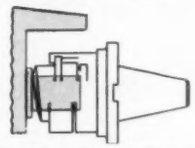
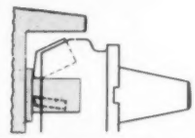
TANK PRODUCTION PROBLEM SOLVED BY *Snyder*



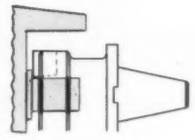
1 Face end of trunnion



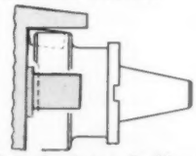
2 Rough hollow mill trunnion diameter



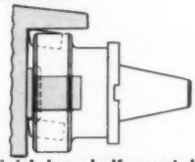
3 Finish hollow mill trunnion outside diameter



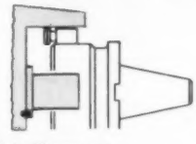
4 Finish face shoulder



5 Rough bore half-round diameter



6 Finish bore half-round diameter and hollow mill shoulder



7 Cut oil groove

8 Remove burr thrown up in grooving, re-using tool from Operation No. 6 above

Eight Machining Operations on Rotor Trunnions for 75-mm Gun Mounts

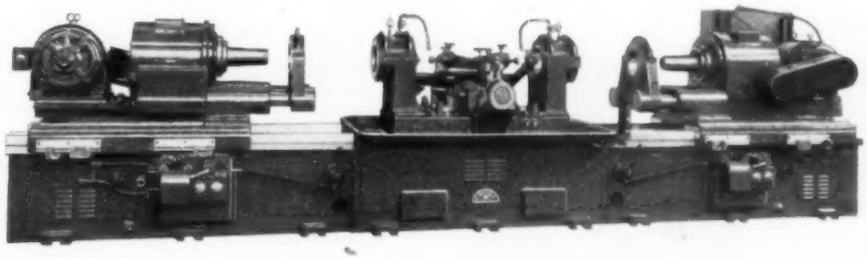
The rotor is cast armor-steel, roughly the shape of a semi-circular shield, with cross bores and trunnions at each end and an opening in the middle. It is heavy, bulky and rapidly changing in cross-section. The job is to hollow mill the trunnions, turn and face a shoulder, and bore a half-round surface below and concentric with the trunnion. Trunnions must be machined square with the cross bores, and to exceptionally close limits. Here's how Snyder engineers licked the problem:

The Solution:

Double-End Snyder Machine . . . One Setting of the Work . . . *Cutters Changed on One Spindle While Opposite Spindle is Working*

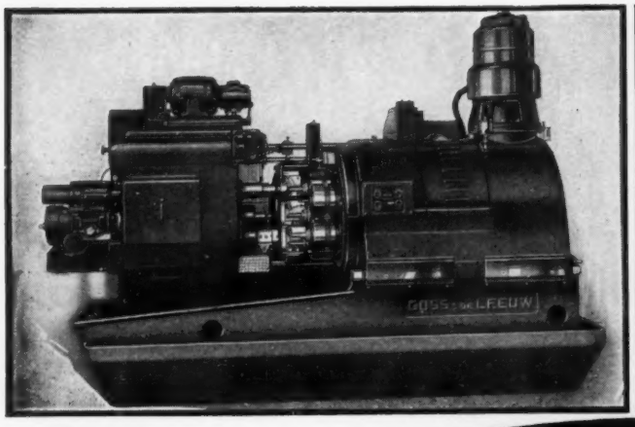
The part is located on Vee blocks, positioned and balanced for stock removal, to target gages, and secured by toe clamps and back-up screws. Tools, ground to a definite gage length, are interchangeably mounted on the spindle end faces. Brackets in front of the tool adaptors support the boring bars while cutters are being changed. Each spindle is worm-driven by a two-speed, 25 horsepower motor, controlled by push buttons both in front and in back of the machine. Coolant is supplied by an integral motor and pump, from a tank in the machine base. The overall length of the base, which is made in three sections, is 285 inches. Performance, output and accuracy—beyond expectations!

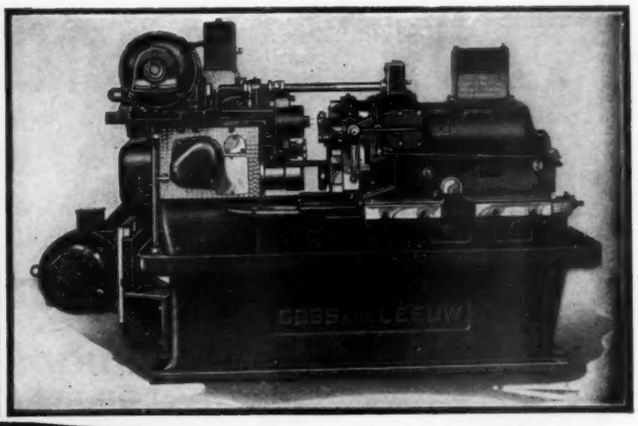
IF YOU WANT HIGH PRODUCTION AT LOW UNIT COST use Snyder's machine designing and building experience and facilities. FOR BEST RESULTS call in Snyder engineers *as soon as you begin to plan* new or increased production.



SNYDER
TOOL & ENGINEERING CO.
3400 E. Lafayette Ave. • Detroit

designers and builders of machinery for HIGH *production at* LOW *unit cost*





WORK ROTATING TYPE

5 Spindles
6 Spindles
8 Spindles

GOSS & DE LEEUW *Multiple Spindle* CHUCKING MACHINES

TOOL ROTATING TYPE

4 Spindles
5 Chucking Positions

On these machines, two threading operations can be handled simultaneously, each thread controlled by its own lead screw.

Among the many other modern features offered in both types are: pre-loaded anti-friction spindle bearings, hardened ways, oversize spindles and gears of chrome-nickel steel, heat-treated.

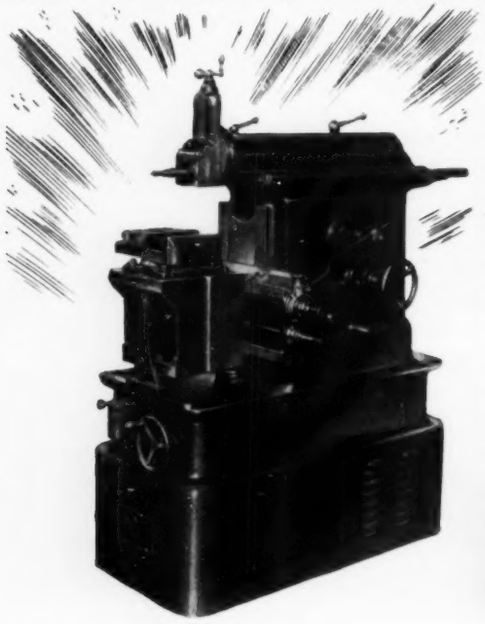
Complete details will be found in descriptive catalog available on request.

GOSS & DE LEEUW MACHINE CO., NEW BRITAIN, CONN.

VERNON SHAPERS GIVE YOU *Most* CAPACITY *Greatest* RIGIDITY per dollar invested

Engineered to meet tool room and industrial demands for high precision and production. Exceptionally smooth in operation due to helical cut bull gear and pinion, accurate, careful machining, and rigid construction.

Convenient external handwheel operates fully enclosed variable speed drive—freeing operator from dangerous open belts. Automatic cross feed (in either direction) permits the operator to attend more than one machine where production schedules require them. Swivel table and vise are standard equipment.



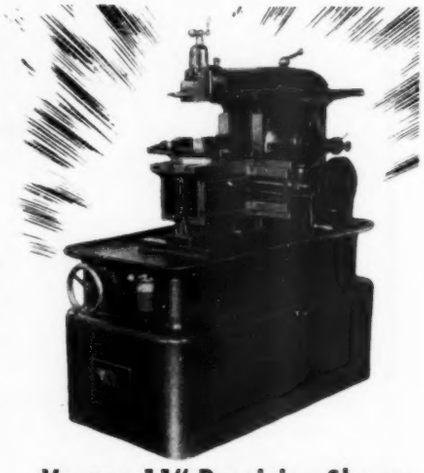
Vernon 12" Heavy Duty Back-Geared Precision Shaper

Recommended for precision tool room or general industrial production. Massive, heavily ribbed construction throughout assures absolute rigidity.

Back-Geared Drive guarantees maximum power on heavy cuts. Helical type bull gear is adjustable for tooth wear and is mounted in Timken tapered roller bearings.

SPECIFICATIONS

Strokes per minute	15 to 170
Table size ... Top	10"x12"
Depth	10"
Approximate weight	1200 lbs.
Motor	1 H.P.



Vernon 11" Precision Shaper

Popular priced shaper for high speed, precision work. Handles all jobs within its capacity as efficiently but much faster than larger, more expensive machines.

SPECIFICATIONS

Strokes per minute	50 to 150
Table size ... Top	7"x9¼"
Depth	7¼"
Approximate weight	800 lbs.
Motor	¾ H.P.

MACHINERY MANUFACTURING COMPANY
1915 EAST 51 ST. VERNON LOS ANGELES CALIFORNIA
Vernon Line of **HORIZONTAL MILLS, VERTICAL MILLS and JIG BORERS, SHAPERS and GRINDERS**

WHAT IS PLAN-O-MILLING?

HOW CAN YOU FIND . . .

1. A better way of forming and thread-milling?
2. A machine that meets the closest tolerances easily?

HOW CAN YOU GET . . .

A new inexpensive machine which, with specially designed fixtures, gives more parts per hour, a higher percentage of perfect parts, and lower cost per part?

THIS NEW FOLDER TELLS!

PLAN-O-MILL FORM- and THREAD-MILLING ENGINEERS DESIGN FIXTURES TO MEET YOUR NEEDS
TYPICAL PLAN-O-MILL FORMING OPERATION
SPECIFICATIONS AND CARE OF NO. 3 PLAN-O-MILL

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YES—send me your new folder, "Just Push the Button".

Name_____

Title_____

Company_____

Address_____

City_____ **State**_____

Designed to Meet a Definite Need!

● Wherever general drilling and boring requirements must be met, the Moline MR106, single-spindle, hydraulic feed, horizontal machine should be considered. Ruggedly constructed and flexible in operation, this machine will be a valuable addition in many shops.

Spindle diameter . . . 4 inches.

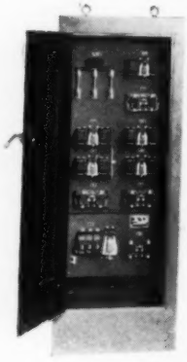
Two spindle speeds available at all times without changing gears.

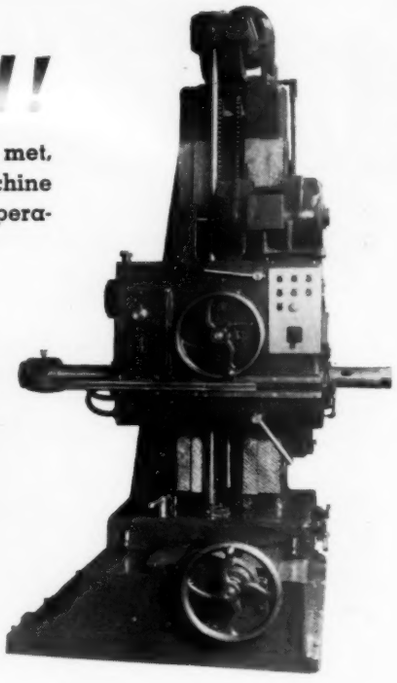
Two feeds and rapid traverse (all hydraulic) both forward and reverse, are selected by one control switch.

Column traverse on base by motor and handwheel.

Spindle head traverse on column by motor and handwheel.

Complete electric control.





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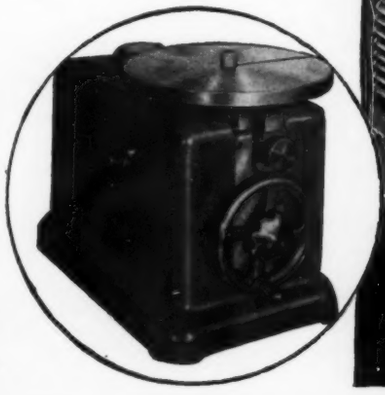
MOLINE TOOL COMPANY

MOLINE, ILLINOIS *Cable Address: "Holehog" Moline* **ESTABLISHED 1901**

BOYAR-SCHULTZ PROFILE GRINDERS Have PROVED Their Value

In the Die Shop, and in the Tool Room working on tools for production, Boyar-Schultz Profile Grinders will be found cutting corners to lower costs and better workmanship.

Whether you are engaged in the mass production of aircraft parts or in die work for defense with tight schedules to meet, you will find these Grinders particularly helpful.



Write For Literature

BOYAR-SCHULTZ CORPORATION

2109 Walnut Street, Chicago, Illinois

The SUNNEN PRECISION HONING MACHINE

is Helping to Speed Up DEFENSE PRODUCTION by Handling Jobs Like These FASTER, More ACCURATELY

Drawing and Blanking Die "Saves time in producing smooth base metal finish."

Inner Bearing Ring "Accurately removes last 'tenth' of stock."

Bronze Valve. The Sunnen method of honing is used to secure a high finish and accuracy.

Molded Composition (Bakelite) Pulleys. Molded composition is a difficult material to machine but it can be easily honed to a smooth finish.

Stone Lettering Air Hammer "Sunnen honing does in five minutes what it took 20 minutes to do by lapping."

"Produced an extremely accurate and glass-like finish."

Diesel Engine Fuel Injector Cylinder "So accurate that a piston can be fit within .00005 inch."

Bushings for Automatic Drinking Fountain "Saves buying new expensive production equipment."

Drill Jig Bushing "Increases sales appeal of product."

"Strict alignment maintained between two holes."

Aviation Hydraulic Cylinder made of Aluminum-Alloy. Improves the quality of the bearing surface. An extremely smooth surface-finish is secured.

Honing was used to correct errors of previous machining operations and to obtain a highly-polished surface finish.

Hardened Steel Parts. Honing is used to remove burrs caused by the flash of a punch press operation.

Mild Steel Clevis. Honing was used to correct errors of previous machining and maintain true alignment of the two bearing surfaces of this clevis.

Hardened Steel Gears. Honing used to remove any distortion after hardening and to selectively size the gears to uniform diameters.

Miniature Model Airplane Cylinders "Eliminates expensive machine set-up."

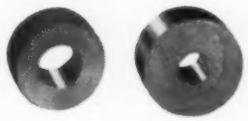
Taper removed at a rate of 80-90 per hour from automobile distributor shaft gears.

Better finish and alignment maintained on yoke for compressor

Aluminum Aircraft Link "produces high finish without bell-mouthing"

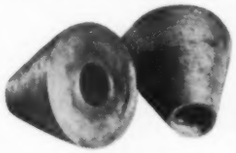
Hardened Steel Inner Bearing Race honed to .00005" limit. Surface finish improved; errors of out-of-roundness eliminated.

Aircraft Valve Tappet Roller. 4-Micro finish.



Hardened Steel Ring Gauge—finished to an accuracy of .000025" for roundness and straightness.

Compressor roller "maintains .00005" limits; increased production over 100%.



Cones for Wheel Balancing Machine "Accurately align hones two interrupted surfaces."

Sunnen honing corrected distortion caused by hardening for manufacturer of small parts.

Crankshaft Grinder Bracket "Replaces expensive machine set-up for short-run production."

Airplane Engine Parts accurately honed to a super-smooth finish.

Saved time in producing a smooth accurate finish on this bronze remote control valve body

Grinds and finishes internal cylindrical surfaces from .185" to 2.400" with guaranteed accuracy of .0001". Relieves big internal grinders. Does not require skilled labor! Can be set up in less than a minute. Is saving money, increasing production and improving quality for hundreds of manufacturers handling important defense orders.

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giving complete information or, if you prefer, a Sales Engineer will be glad to call with his demonstrator and show you what this machine can do on your job.

Your First Step Toward Greater Tool-Economies

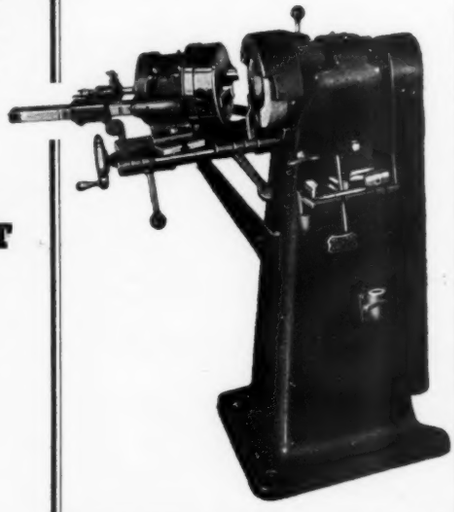
With High Speed tools becoming harder to get, it is important to keep all your tools on the job as long as possible. In defense industries everywhere, Oliver-conditioned tools are producing uniformly accurate work, cutting longer and faster with less power consumption. These production-savings and tool-economies are made possible because, with Oliver Tool Conditioners, every tooth and cutting edge of every tool is automatically ground to its correct, new-tool contour — faster, and far more accurately than by any hand-controlled method. Unevenly ground drill points, cutters with half their teeth "loafing", and other causes of inaccuracy and tool failure, are impossible when Oliver Tool Conditioners are used.

Start NOW — with Oliver Tool Conditioners in your toolroom—to insure the production-savings and tool-economies that are so important today. Write for full details and specifications of the complete Oliver line.

OLIVER UNIVERSAL TOOL AND CUTTER GRINDER

OLIVER OF ADRIAN PRODUCTS

OLIVER No. 510 DRILLPOINTER



Don't Neglect Your Toolroom It's the Backbone of Production!

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AUTOMATIC DRILL GRINDERS — TOOL AND CUTTER GRINDERS—DRILL POINT THINNERS — TEMPLATE TOOL GRINDERS — FACE MILL GRINDERS, DIEMAKING MACHINES

Tools and Accessories

Work Holders • Stock Feeds • Tool Holders • Machine Attachments • Punching Units, Dies • Air Cylinders • Coolant Systems and Lubricators • Production Counters and Cycle Timers • Grinding Wheels and Dressers • Cutters, Broaches and Saws • Die Heads and Taps • Tool Materials • Measuring Tools, Gages, Inspection Machines • Portable Power Tools • Hand Tools

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THESE 2 SIZES OF
SKILDRILL
ARE A "MUST" IN EVERY DEFENSE PLANT!
Now, more than ever before, you need these two modern SKILDRILLS to punch holes in every bottleneck . . . to speed your production flow! There's extra power, extra speed, extra ease of handling built into these two compact SKILDRILLS . . . for precision production drilling, for installation or assembly work in plants building aircraft, tanks and all other defense equipment.
Ask your distributor to demonstrate these SKILDRILLS on your own work. Once you see how they perform, you won't be without them!
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SKILDRILL Model 80
Capacity ½ in. in steel, 1¼ in. in wood. Only 11½ in. long, 3½ in. wide, weighs only 8 lbs. Gets into tightest places.
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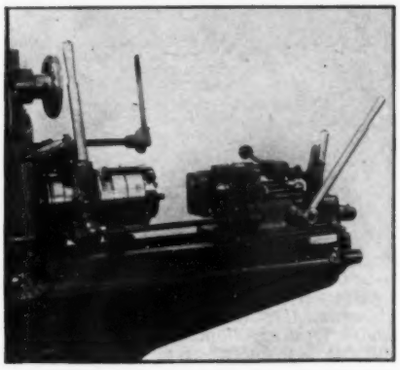
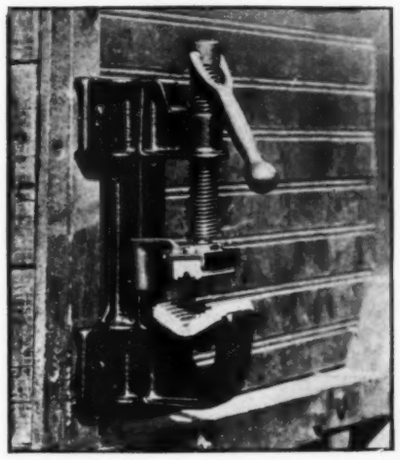
Capacity ¼ in. in steel, ½ in. in wood. Only 6⅝ in. long, weighs only 2¾ lbs. Fits the palm of your hand.
SKILSAW PORTABLE ELECTRIC TOOLS
★ FOR THE DEFENSE OF AMERICA ★

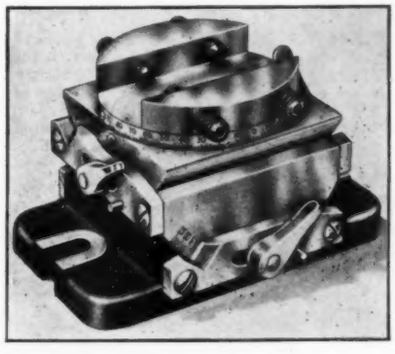
TOOLS and ACCESSORIES



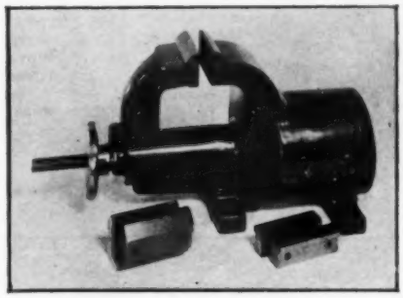
CAP HOLDING DEVICE—*Landis Machine Co., Waynesboro, Pa.* Designed for Landis ¾ and ⅞-in. single or double head threading machines, this fixture has been developed to hold 37-mm. shell caps in alignment for threading. Vol. 85, p. 509.



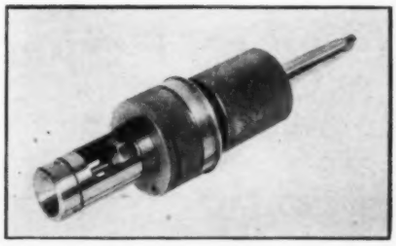
PIPE VISE—*Armstrong Mfg. Co., Bridgeport, Conn.* The No. 222 open side pipe vise for installation on a bench or side of a service truck has broad jaws, a frictionless disk, quick-acting screw, and a swinging handle. It takes pipe from ⅛ to 2 in. in diameter. Vol. 85, p. 462.



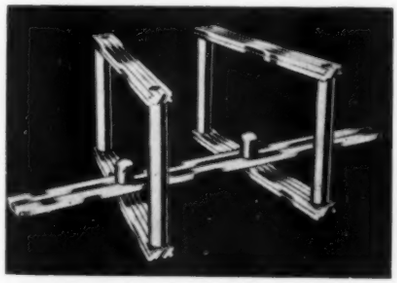
ANGLE VISE—*Hammond Machinery Builders, Inc.*, 1618 *Douglas Ave., Kalamazoo, Mich.* Constructed on a double-cradle principle, permitting adjustment in three planes, this vise is designed for grinding chip breaker grooves in tips of carbide tools. Vol. 85, p. 1170.



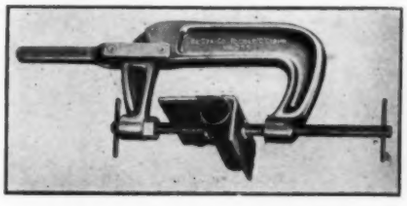
VISE—*Fastmatic Vise Co.*, 120 *Boylston St., Boston, Mass.* Available with a variety of hardened, soft or formed jaws and in a number of sizes, this quantity-production vise has an oil or air operated piston directly connected to the sliding jaw member. This provides smooth and rapid jaw traverse. Vol. 85, p. 730.



CENTERING CHUCK—*Universal Engineering Co., Frankenmuth, Mich.* A centering machine can be made out of almost any medium sized drill press with this centering chuck. Vol. 85, p. 786.

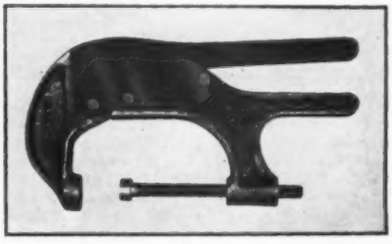


DIE CRADLE—*Acro Tool & Die Works, 2815 Montrose Ave., Chicago, Ill.* The Acro die cradle is adjustable in length and eliminates makeshift methods for supporting dies, jigs and metal parts while drilling, counterboring, tapping, milling or grinding. Vol. 85, p. 678.

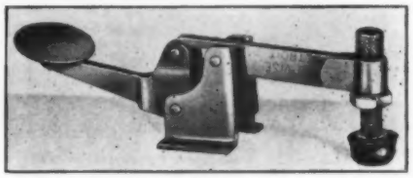


TOGGLE CLAMP—*Detroit Stamping Co., 343 Midland Ave., Detroit, Mich.* A toggle clamp having the lower half swinging clear of the work, enables the operator to get around obstructions in fixtures and to clamp firmly such pieces as angle T-shaped iron. Vol. 85, p. 90.

HYDRAULIC VISE—*Studebaker Machine Co., Chicago, Ill.* Workmen can use both hands in setting up and removing work while operating this foot controlled hydraulic vise. It is capable of developing jaw pressures up to 5 tons and speeds vise work. Vol. 85, p. 997.

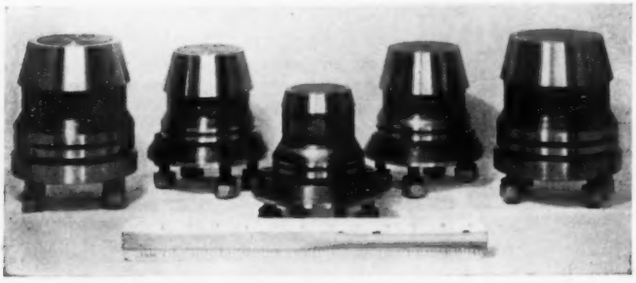


C-CLAMP—*Knu-Vise, Inc.*, 16891 *Hamilton Ave., Detroit, Mich.* The "Klamp-acto" C-clamp, available in three models with 5-in., 6-in., and 10-in. jaws, combines the deep throat of the standard clamp with the holding pressure of a toggle movement. Vol. 85, p. 629.

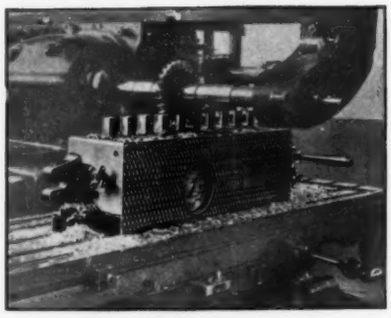


TOGGLE CLAMP — *Knu-Vise, Inc.*, 16891 *Hamilton Ave., Detroit, Mich.* Pressure in excess of 500 lb. is obtained with the Model No. 830 Midget toggle clamp which is 4 in. long by 1½ in. high. Vol. 85, p. 1176.

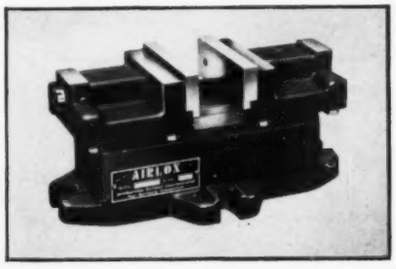
TOOLS and ACCESSORIES—Work Holders



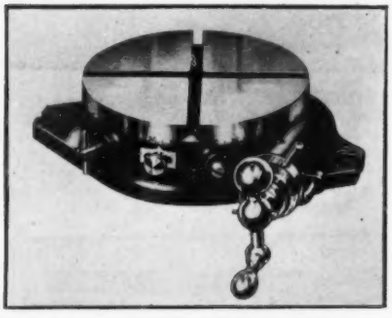
BEARING CENTERS — *Ready Tool Co., Bridgeport, Conn.* These ball-bearing centers are made with replaceable butt welded high-speed steel points. They were developed for automatics where form cuts must be taken on large work. Vol. 85, p. 206.



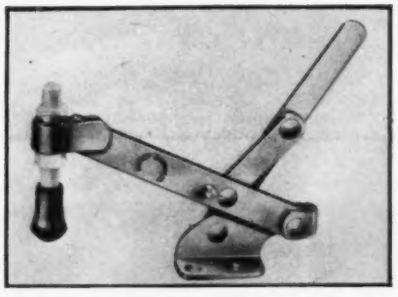
HYDRAULIC WORK HOLDER—*Hydra, Inc.*, 417 *South Hill St., Los Angeles, Calif.* Loading and unloading time is reduced to a minimum by the Hydra-Grip, a hydraulic work holder for gang chucking as many as ten pieces. It weighs 125 lb., is 29 in. long, 5½ in. wide and 6 in. high. Vol. 85, p. 942.



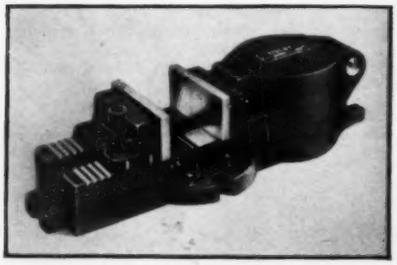
VISE—*Production Devices, Inc.*, 213 *Comstock Bldg., East Hartford, Conn.* The Airlox Junior vise is powered by a special Schrader air cylinder. Cylinder and mechanism are inclosed within the vise body and shielded from chips, coolants and lubricants. Vol. 85, p. 782.



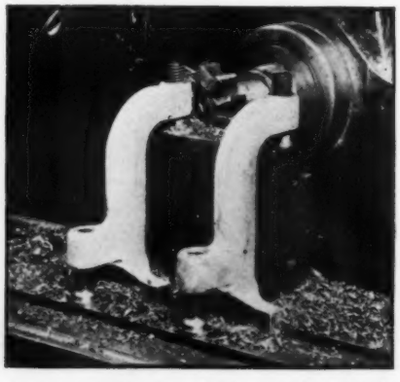
ROTARY TABLE—*Machinery Manufacturing Co.*, 1915 *E. 51st St., Vernon Los Angeles, Calif.* A 7-in. Vernon rotary table for heavy-duty use is only 2¾ in. high. For easy adjustment, quadrants are graduated from 0 to 90 deg., and the friction-loaded worm dial is calibrated into 240 minutes. Vol. 85, p. 948.



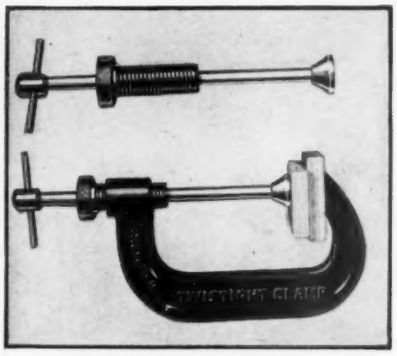
TOGGLE CLAMP—*Detroit Stamping Co.*, 343 *Midland Ave., Detroit, Mich.* The No. 200 Junior "De-Sta-Co" light duty toggle clamp for production work in the aircraft industry, provides a clamping ratio of 33:1 and measures 6×6×1⅞ in. Vol. 85, p. 192.



PNEUMATIC VISE—*Production Devices, Inc.*, 213 *Comstock Bldg., East Hartford, Conn.* Milling, shaping, planing, drilling, tapping, assembling and bench work are speeded with the "Airflox" pneumatic machine and bench vise. Over-all length is 20 in.; width, 7 in.; height, 4¼ in.; jaw width, 5 in.; and jaw opening, 5 in. Vol. 85, p. 188.

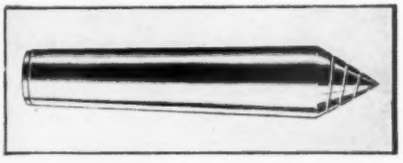


CLAMP—*Advance Machine Works*, 3727 *Weisser Park Ave., Fort Wayne, Ind.* Greater clamping power is provided in the improved 90-deg. angle clamp available in 4, 6 and 8 in. throats. These clamps are made of alloy steel having a yield strength of 78,000 lb. per sq. in. Vol. 85, p. 192.



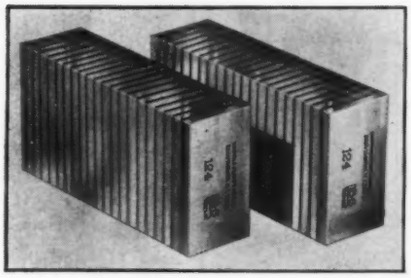
PUSH-PULL C-CLAMP—*Mechanics Engineering Co., Box 243, Jackson, Mich.* The "Twistight" push-pull C-clamp is suitable for holding small assemblies for welding. It consists of a rolling clutch, inside a screw barrel which grasps the clamping rod. Vol. 85, p. 366.

MAGNETIC BLOCKS—*Brown & Sharpe Mfg. Co., Providence, R. I.* The No. 750D magnetic V-block and the No. 124 magnetic chuck parallel employ permanent magnets, thus requiring no connection to any source of power. V-block embodies cylindrical magnet which is turned to hold or release work. Vol. 85, p. 205.

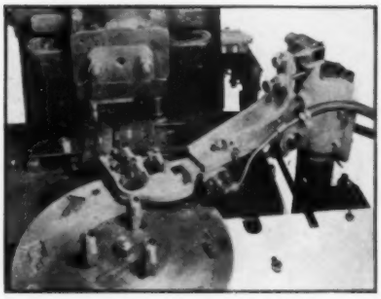


HELICAL GROOVE LATHE CENTER—*Chicago Mfg. & Distributing Co.*, 1928 *W. 46th St., Chicago, Ill.* This lathe center has left-handed helical grooves which lubricate the entire surface of work supported by the dead center on tailstock. Center can be relubricated without stopping lathe. Vol. 85, p. 678.

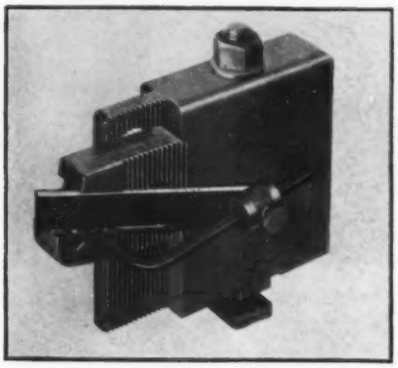
MAGNETIC CHUCK—*Brown & Sharpe Mfg. Co., Providence, R. I.* A large size rectangular magnetic chuck, Type No. 1236, has a working surface of 12⅛×36 in., and a magnetic surface approximately 9½×29⅝ in. Height is 4⅞ in. Vol. 85, p. 1002.



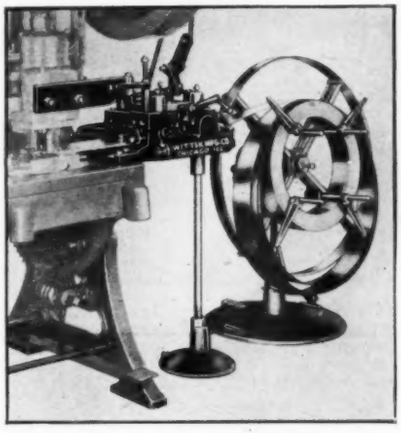
MAGNETIC CHUCK PARALLELS—*Brown & Sharpe Mfg. Co., Providence, R. I.* Matched numbered pairs of magnetic chuck parallels made of alternating steel and non-magnetic bronze spacing strips are used on chucks of permanent magnet and electro-magnet types for holding small work and work with projecting surfaces. Parallels are 3½ in. long, ⅞ in. wide and 1⅞ in. high. Vol. 85, p. 1238.



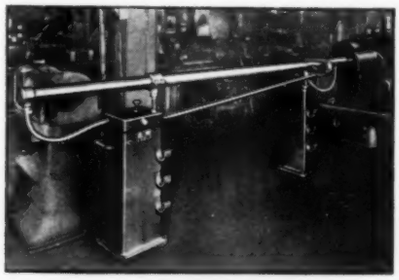
PRESS FEED—*Heyman Mfg. Co.*, 157 *Chambers St., New York, N. Y.* Suitable for runs between 3,000 and 500,000 pieces, this semi-automatic device feeds blanks to a forming or drawing die. Blanks are placed on and finished pieces removed from the indexing table or dial. Vol. 85, p. 464.



PARTING TOOL HOLDER—*Empire Tool Co.*, 8790 *Grinnell Ave., Detroit, Mich.* Holders for Luers cutting-off blades are available for use on Brown & Sharpe automatic wire feed and hand screw machines, as well as for other automatic and hand screw machines of ⅞-in. capacity and under. Vol. 85, p. 190.



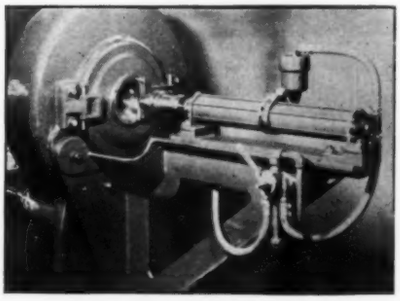
AUTOMATIC ROLL FEED—*Wittek Mfg. Co.*, 4305 *W. 24th Place, Chicago, Ill.* Automatic roll feed and reel stand for feeding stock into punch press accurately. The rolls turn constantly while the forward movement of the stock is arrested momentarily to allow for stamping operation and ejection of the stamped part. Vol. 85, p. 1298.



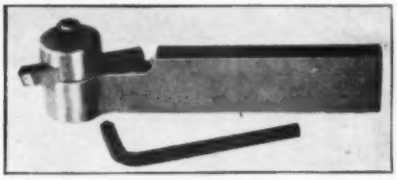
PNEUMATIC BAR FEED—*W. C. Lipe, Inc.*, 208 *S. Geddes St., Syracuse, N. Y.* This pneumatic bar feed unit, for use with machines having fixed stops, is available in three models: No. 125, capacity 1 in. diameter; No. 225, capacity 2 in. diameter; and No. 300, capacity 2½ in. diameter. Vol. 85, p. 274.

PARTING TOOL HOLDERS—*Empire Tool Co.*, 8790 *Grinnell Ave., Detroit, Mich.* This company has begun manufacture of Luers cutting-off blades and holders under license from John Milton Luers Patents, Inc. These blades save sharpening time, as well as removal and insertion time. Vol. 85, p. 40.

MAGNETIC CHUCK CONTROL—*Electro-Matic Products Co.*, 2235 *N. Knox Ave., Chicago, Ill.* One or a number of work pieces can be removed from chuck for gaging purposes with retention of residual magnetism in all pieces by using the Neu-T-rol magnetic chuck control. Vol. 85, p. 1238.



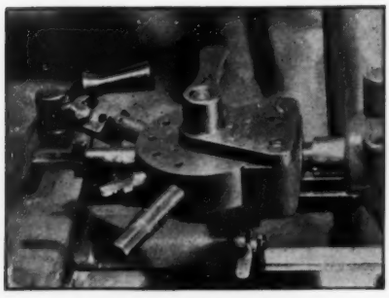
AUTOMATIC SWAGER FEED—*Standard Machinery Co., Providence, R. I.* Two types of automatic feed are used on rotary swaging machines for banding shell from 20 to 155 mm. Vol. 85, p. 830.



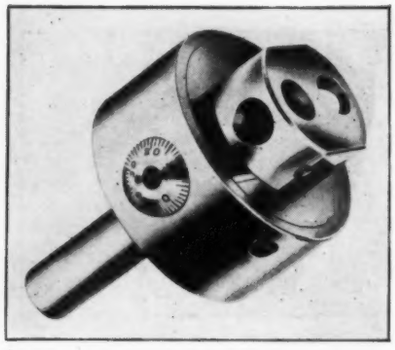
TOOL HOLDER—*Smith Power Transmission Co.*, 1545 *E. 23rd St., Cleveland, Ohio.* Flexoid holder of hard alloy steel sets tool bit at any required angle. It is available with ⅜ to ⅞ in. shanks to take from ¼ to ½ in. square bits. Over-all length is 6 to 10 in. Vol. 85, p. 682.

CLAMPS—*Products Engineering Co., Los Angeles, Calif.* Drill, jig draw, knife, toggle and jig cam clamps are included in a line of quick-acting, standard clamps for jigs and fixtures. Vol. 85, p. 946.

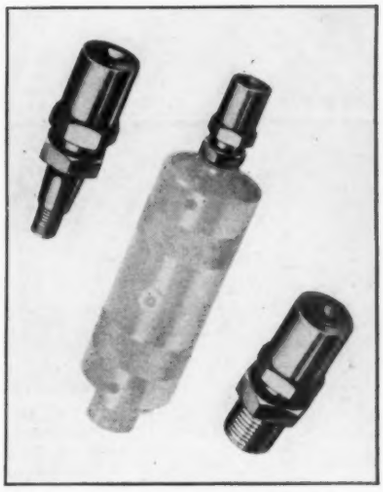
TOOLS and ACCESSORIES—Tool Holders



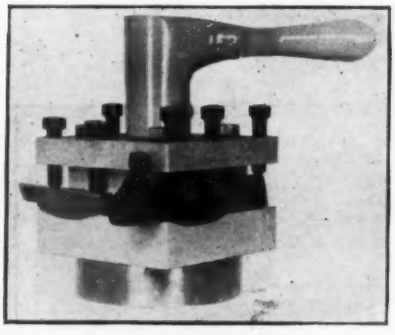
TAILSTOCK TURRET — *Specialties Mfg. Co., 35 Farrand St., Bloomfield, N. J.* Productivity of any engine lathe is increased with the "Quadruplex" tailstock turret. This device has four positions for tools having 5/8 in. diameter shanks. Vol. 85, p. 268.



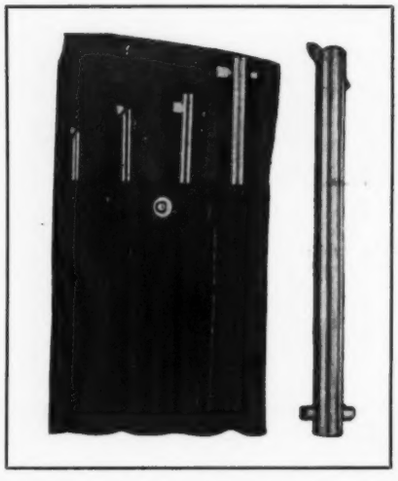
OFFSET BORING HEAD—*Fray Machine Tool Co., Glendale, Calif.* Retaining ring on the tool carrying block and excludes chips from the micrometer mechanism. The head has a 2-in. body diameter, with length of 1 5/8 in. Offsets are 1/8 in. Micrometer dial has 50 divisions of 0.001 in. each. There are three 3/8 in. receptacles for boring bars. Vol. 85, p. 1352.



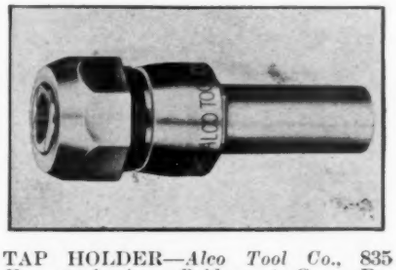
COLLET CHUCK—*Stow Mfg. Co., Binghamton, N. Y.* A compact, single-purpose collet chuck which can be attached quickly to hand-pieces used on Stow flexible shaft machines is furnished in two sizes, one with 1/4 in. and the other with 3/8 in. chucking capacity. It is made in two styles. Vol. 85, p. 460.



FOUR-TOOL TURRET—*M. Orr Co., 1228 Brighton Rd., Pittsburgh, Pa.* The Hercules 4×4 in. turret mounts directly on cross-carriage of standard engine lathes and holds four tools. Individual elevating rockers for each tool eliminate shims and obviate need of special grinding. Vol. 85, p. 1000.

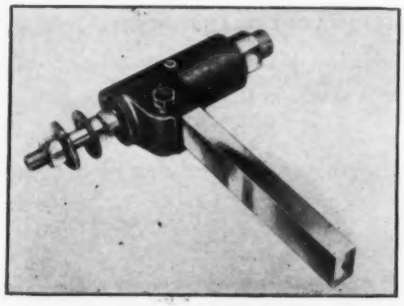


BORING BAR SET—*Flynn Mfg. Co., 433 Bates St., Detroit, Mich.* Small boring bars for the toolmaker, diemaker, and all-round machinist are contained in set No. 62. Sizes of bars are 1/4, 5/16, 3/8, and 1/2 in. Corresponding toolbit sizes are 3/16, 1/4, and 5/16 in. round and 5/16 in. square. Vol. 85, p. 274.

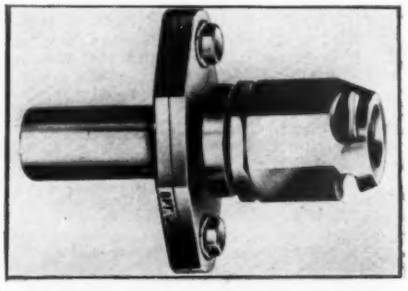


TAP HOLDER—*Alco Tool Co., 835 Housatonic Ave., Bridgeport, Conn.* Releasing-type tap holder for hand screw machines and turret lathes requires no pins or bushings. Vol. 85, p. 632.

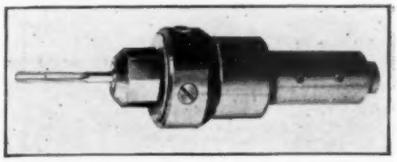
TURRET LATHE TOOL—*Gisholt Machine Co., 1201 E. Washington Ave., Madison, Wis.* This slide tool for turret lathes, designed to hold small boring bars and forged cutters, has adjustable stops for quick setting and to permit duplicate work. Vol. 85, p. 1208.



TOOL POST ATTACHMENT—*Stow Mfg. Co., Inc., Binghamton, N. Y.* This tool post attachment makes it possible to adapt lathes to many external and internal grinding operations. Device accommodates grinding wheels as large as 6 in. with 1-in. face. Drive is from flexible shaft machine. Vol. 85, p. 831.

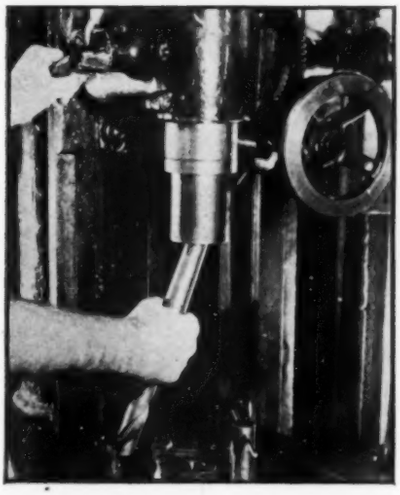


ACORN-TYPE DIE HOLDER—*Alco Tool Co., 835 Housatonic Ave., Bridgeport, Conn.* Releasing model acorn-type die holder for hand screw machines and turret lathes can be used on old machines with worn turrets and bearings to produce good work. Vol. 85, p. 680.

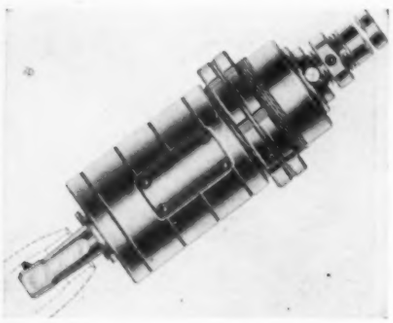


FLOATING CHUCK—*Universal Engineering Co., Frankenmuth, Mich.* Floating chuck designed to operate in a horizontal position in automatic screw machines and turret lathes. Weight of the various tools can be counterbalanced by means of spring adjustment. Vol. 85, p. 1240.

COLLET CHUCK — *Hardinge Bros., Inc., Elmira, N. Y.* A slight turn of the handwheel one way or the other opens and closes these Sjogren collets. Capacities from 1 to 1¾ in. round are available. Vol. 85, p. 202.



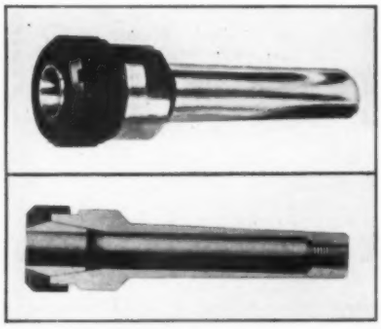
DRILL REMOVER—*Advance Machine Works, 3727 Weisser Park Ave., Ft. Wayne, Ind.* Attachment for removing drills from drill spindles leaves the operator a free hand with which to grasp the drill. Breakage of drill points which results from drills falling to the table when knocked out with a drift is eliminated. Vol. 85, p. 729.



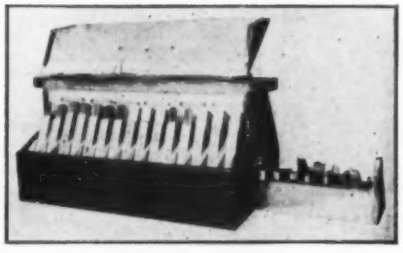
CONTOUR BORING HEAD—*Gairing Tool Co., 21221 Hoover Road, Detroit, Mich.* This automatic boring tool automatically feeds bit outward as it is moved into a shell nose to machine the inside contour of a 3.45-in. shell. At end of cut, tool retracts automatically. Vol. 85, p. 200.

DRILL CONTAINER — *Burbridge & Sons, Kenosha, Wis.* Drill container, consisting of a cylindrical case, 5 in. high and slightly over 2 in. in diameter, fits any tool box and holds drills No. 1 to 60. Vol. 85, p. 782.

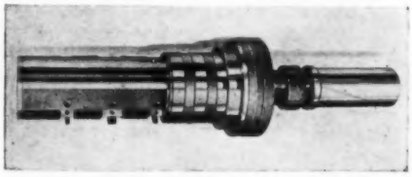
CHUCKS AND COLLETS — *Modern Tool Works, Rochester, N. Y.* With the "Magic" quick-change chuck in revolving-spindle machines, tools can be changed while the machine is running without slowing down the spindle. Chucks are made in six capacities from 1⅜ to 5 in. diameter. Vol. 85, p. 203.

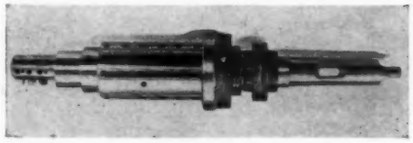


COLLET CHUCKS — *Universal Engineering Co., Frankenmuth, Mich.* The nut in the three larger collet chucks tightens against a floating sleeve, reducing friction and making locking easier and more positive. Vol. 85, p. 464.

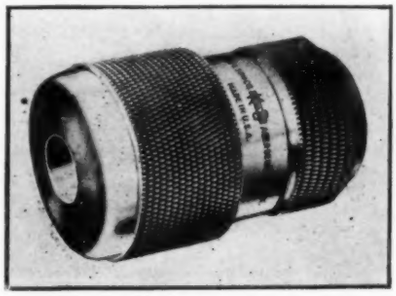


CARBIDE TOOL CARRIER—*Carboloy Co., Inc., 11149 E. Eight Mile Rd., Detroit, Mich.* This carbide tool carrier has been designed for segregating tools according to grade, style and type of work on which used. Vol. 85, p. 1298.

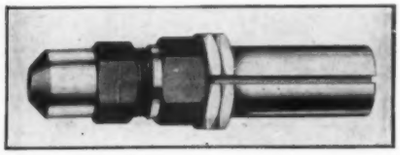




BORING TOOL HOLDERS—*Scully-Jones & Co., 1901 S. Rockwell St., Chicago, Ill.* A line of special tools has been developed for recessing, grooving, undercutting, necking and facing operations. Holes as small as ⅛ in. can be recessed with grooves of varying width and depths. Vol. 85, p. 201.

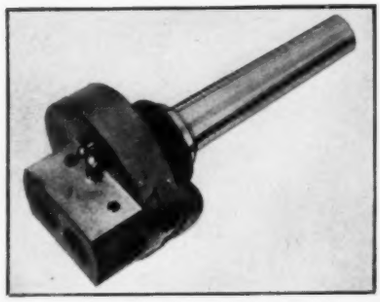


DRILL CHUCKS—*K. O. Lee Co., Aberdeen, S. D.* Use of fewer parts and hardening of all parts but the sleeve has improved the durability of the "Knock Out" keyless drill chucks available in six sizes, ranging from 0 to ¼ in., to ¼ to ⅞ in. Vol. 85, p. 894.



PRECISION ECCENTRIC — *Drill Chuck Div., Erickson Steel Co., E. 80th & Bessemer Ave., Cleveland, Ohio.* No bushings are needed with these precision eccentrics which adapt collet chucks for use on automatic screw machines. Centering is simplified as hexagons act as measures. Each point on the hex has an eccentricity of 0.005 in. Vol. 85, p. 34.

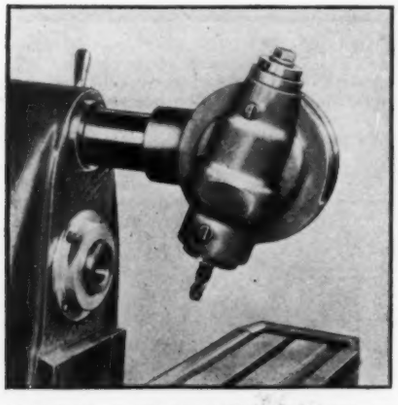
TOOLS and ACCESSORIES—Machine Attachments



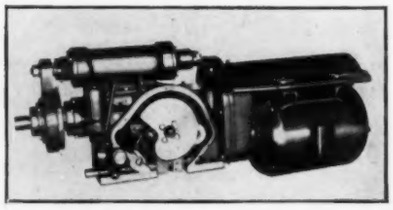
OFFSET BORING HEAD — *Pacific Specialty Supply Co., 344 N. Vermont Ave., Los Angeles, Calif.* Two hardened buttons, one attached to the stationary and the other to the adjustable part of the head, are checked with a micrometer before the required hole is bored with this offset boring head. Boring capacity is 15 in. Boring bar hole size is 1 in. Outside diameter of head is 4⅞ in. and the length without shank is 3⅛ in. Vol. 85, p. 456.

TOOL SLEEVES—*Midwest Tool & Mfg. Co., 2360 W. Jefferson St., Detroit, Mich.* Hardened and ground sleeves are made in 101 sizes with both Morse and Brown & Sharpe tapers. Not shown. Vol. 85, p. 203.

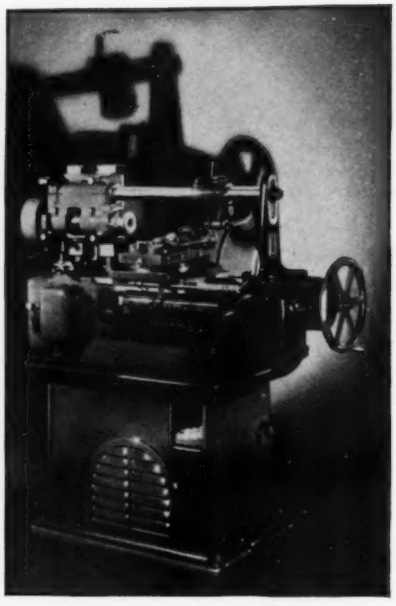
DRILL INDEXES—*Huot Mfg. Co., 128 E. Tenth St., St. Paul, Minn.* Three sizes have been added to the line of drill indexes. Combination drill stand and indexed container provides tap information and decimal equivalents. Not shown. Vol. 85, p. 206.



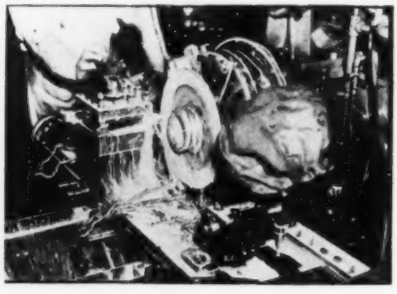
MILLING ATTACHMENT—*Machinery Mfg. Co., 1915 E. 51st St., Vernon, Los Angeles, Calif.* Vertical head for use with the Vernon No. 0 horizontal milling machine can be used freely at any angle and in any plane. Spindle has a No. 7 B&S taper. Vol. 85, p. 190.



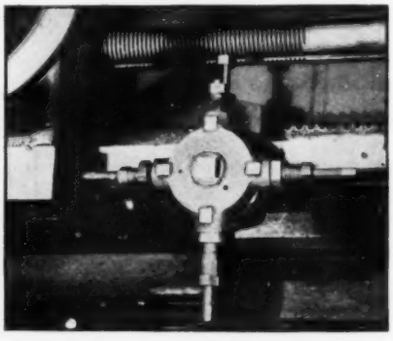
UNIT ATTACHMENTS — *Enterprise Machine Parts Corp., 2731 Jerome Ave., Detroit, Mich.* These units, developed to form special machines, are adaptable for drilling, milling, tapping, reaming and spot facing operations. Full automatic cycle with interlocked controls permits multiple operation of groups of units. Vol. 85, p. 407.



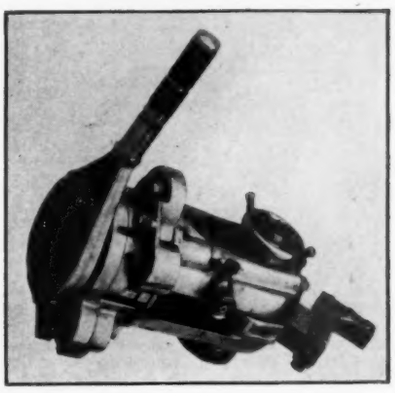
HOBBER ACCESSORIES—*Barber-Colman Co., Rockford, Ill.* Increased production and convenience of operation, as well as greater versatility, result from the addition of numerous accessories, to the No. 3 standard and precision hobbing machines. Included are vertical feed, horizontal cam feed, handwheel-operated collet, lever-operated collet, swivels and taper spindle. Vol. 85, p. 131.



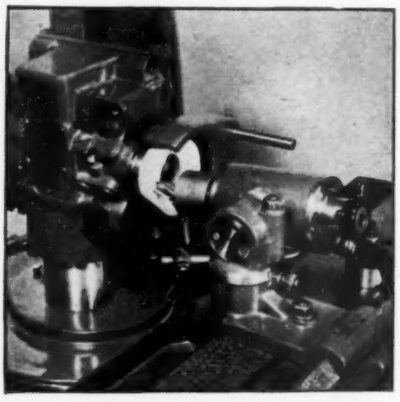
DUPLICATOR—*Detroit Universal Duplicator Co., 253 St. Aubin Ave., Detroit, Mich.* Eliminating forming tools and special skill in contour turning work, portable duplicating equipment is used in conjunction with turret lathes. Detachable duplicating control mechanism makes contour turning entirely automatic. Vol. 85, p. 676.



TOOL SHOP—*Specialties Mfg. Co., 35 Farrand St., Bloomfield, N. J.* "Quadruplex" stop can be attached to engine lathes, milling machines and boring mills in the same manner as the conventional micrometer stop. To set any of the four stop screws. Vol. 85, p. 318.

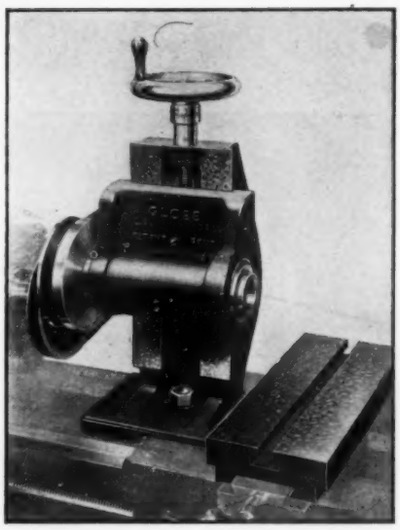


MACHINE HEAD — *John Kis, 2028 Phillips Ave., Racine, Wis.* Complicated internal surfaces on awkward, bulky parts can be finished with this Universal machine head. This head is applicable to horizontal boring mills, vertical boring mills and jig borers. Vol. 85, p. 320.

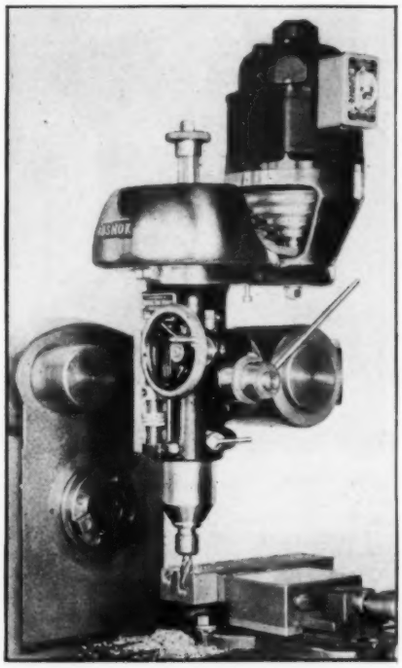


END MILL SHARPENING ATTACHMENTS—*Brown & Sharpe Mfg. Co., Providence, R. I.* No. 10 and No. 13 end mill sharpening attachments have been redesigned to permit the sharpening of end teeth as well as peripheral teeth. Vol. 85, p. 831

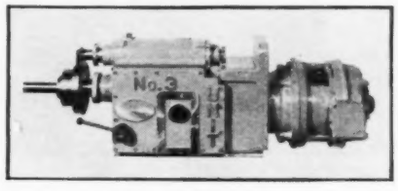
END MILL GRINDING FIXTURE—*Roan Mfg. Co., Racine, Wis.* An end mill grinding fixture which weighs only 8 lb. converts any high-speed drill press into a tool grinder. The fixture takes single or double end, straight or tapered shank, right- or left-hand mills up to 1-in. shank diameter. Arbor fits ⅜-in. capacity drill press chuck. It also grinds hollow mills, counterbores and other facing tools. Vol. 85, p. 136.



MILLING ATTACHMENT—*Globe Products Mfg. Co., 3380 Robertson Blvd., Los Angeles, Calif.* Lathe milling attachment employs lathe spindle for drive and uses carriage movements to operate its table. It can be used on large lathes direct or with adapter baseplate. Vol. 85, p. 90.

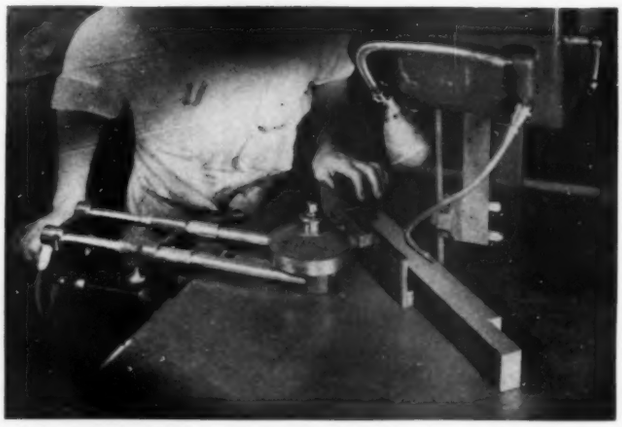


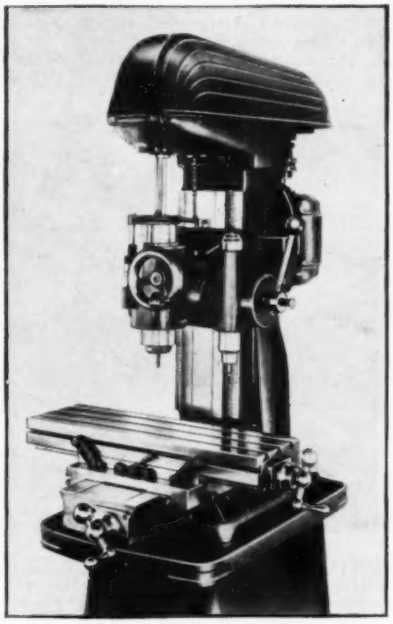
MILLING ATTACHMENT — *Rusnok Tool Works, 1841–45 West Carroll Ave., Chicago, Ill.* Model ST vertical milling head attachment, designed for heavy-duty end mill operations, has six spindle speeds from 250 to 3,000 r.p.m. Quill has 4 in. travel and chuck for ½-in. end mills. Vol. 85, p. 1288.



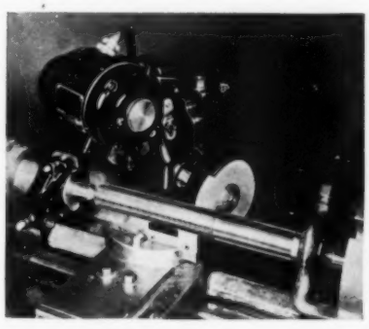
MODEL E EMPCO UNIT — *Enterprise Machine Parts Corp., 2731 Jerome Ave., Detroit, Mich.* The Model E Empco Unit comes in four sizes with maximum stroke lengths of 2½, 3, 5½ and 8½ in. and can be used with multiple spindle heads or attachments. Vol. 85, p. 1288.

MITERING HEAD—*Continental Machines, Inc., 1203 Thacker St., Minneapolis, Minn.* Adapted for manual or power feeds, the Doall mitering attachment mounts on the work table of a bandsaw so that notching, squaring, ripping and mitering can be performed without excessive set-up delays. Vol. 85, p. 1021.

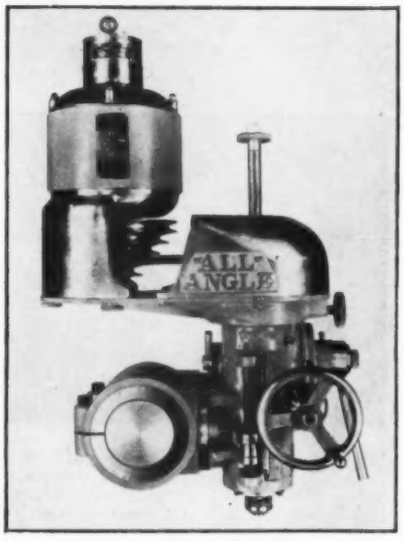




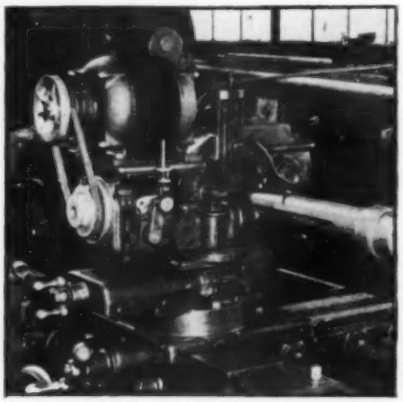
PROFILING ATTACHMENT — *Machinery Mfg. Co., 1914 E. 51st St., Vernon, Los Angeles, Calif.* Addition of the profiling attachment to a vertical miller provides an easily operated tool for duplicating a wide variety of cavity mold work and is suitable for production of irregularly shaped small parts. Vol. 85, p. 409.



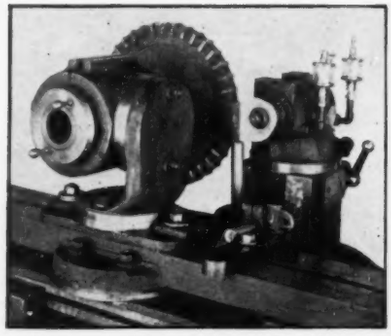
THREAD GRINDING ATTACHMENT —*Dumore Co., Fourteenth & Racine Sts., Racine, Wis.* Reversible portable precision grinder and accurate thread grinder are combined in an attachment for the No. 5 precision grinder. This device is suitable for small lot thread grinding jobs. Vol. 85, p. 203.



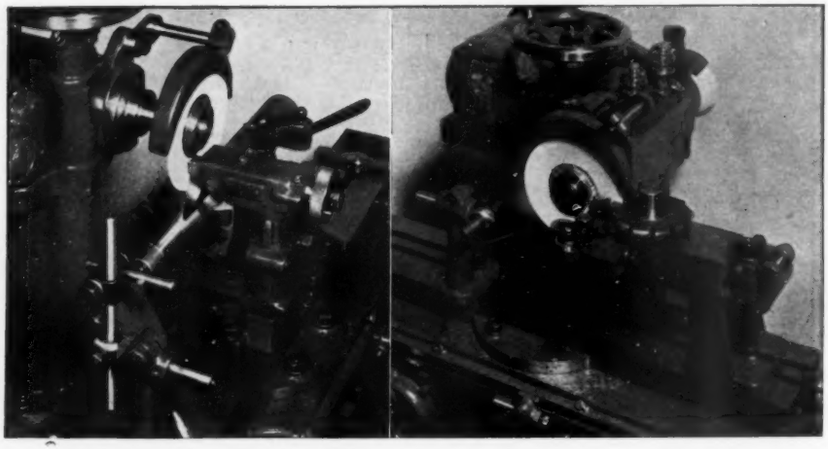
MILLING ATTACHMENT—*Fray Machine Tool Co., 515 W. Windsor Rd., Glendale, Calif.* "All-Angle" full-universal milling attachment is equipped with a ball-bearing motor which swings completely around the housing and can be locked at any point. Six-step pulleys provide spindle speeds from 375 to 5,200 r.p.m. Spindle travel is 3½ in. Vol. 85, p. 728.



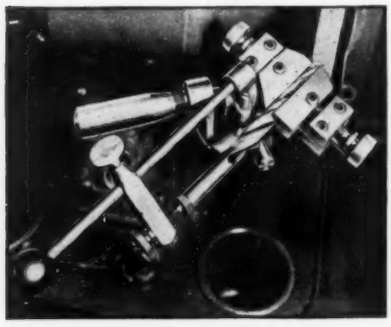
MILLING ATTACHMENT — *Michael Hanna, Glen Rogers, W. Va.* Marvel No. 2 milling attachment can be fitted to any lathe with 16-in. swing or over. Key seats, slots, splines, and similar jobs can be cut. The vertical attachment gives an adjustment of 4 in. for die and tool work. Vol. 85, p. 729.



CUTTER GRINDING ATTACHMENT—*Covel Mfg. Co., Benton Harbor, Mich.* Face mill grinding attachment which handles larger cutters than previous models can be mounted on any grinder having a flat top table from 4½ to 6 in. wide. The device has a No. 7 Morse taper hole in the spindle. Distance from base to the center of spindle is 6¾ in. Vol. 85, p. 274.

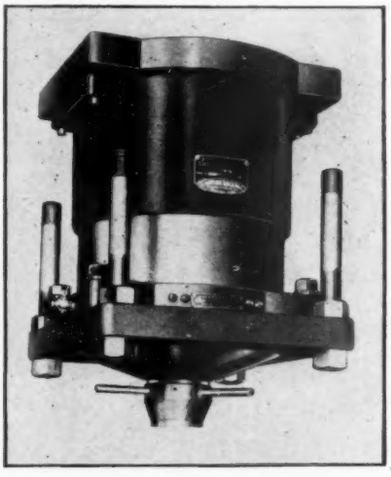


CUTTER GRINDER ATTACHMENT—*Brown & Sharpe Mfg. Co., Providence, R. I.* No. 10 cutter sharpening attachment of through-feed type gives a straight cut across the entire tooth face and provides for accurate sharpening of formed cutters up to 6 in. diameter with straight teeth. With the in-feed type, formed cutters from 2 to 6½ in. diameter may be sharpened. Vol. 85, p. 270.

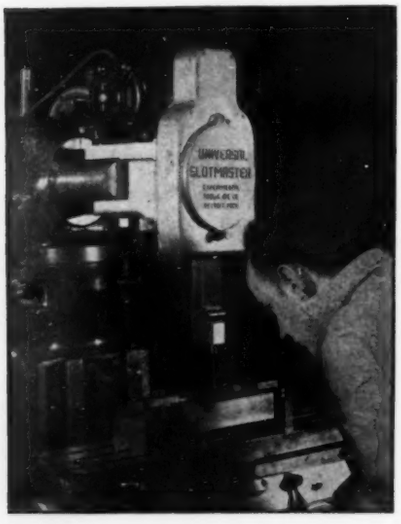


DRILL GRINDING ATTACHMENT—*Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee, Wis.* This drill grinding attachment uses the face of the wheel and has a capacity of ⅛- to ⅝-in. drills. Lip clearance and angles can be ground at any degree required. Vol. 85, p. 272.

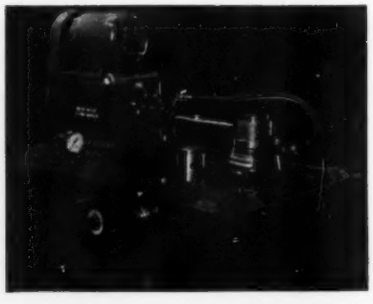
DRILL PRESS ATTACHMENT — *Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee, Wis.* Attachment for 14-in. drill presses provides a range of twelve speeds through various combinations for both high-speed and low-speed models. It consists of heavy casting which mounts in the drill press column, together with a cone pulley and two belts. Vol. 85, p. 274.



DIE CUSHION—*Dayton Rogers Mfg. Co., 2830 13th Ave. S., Minneapolis, Minn.* Available in six sizes, having deep drawing capacities of 5 in. and less, with ring holding pressure up to 10 tons on a 100-lb. air line. Model DM universal pneumatic die cushion is completely self-contained. Vol. 85, p. 270.



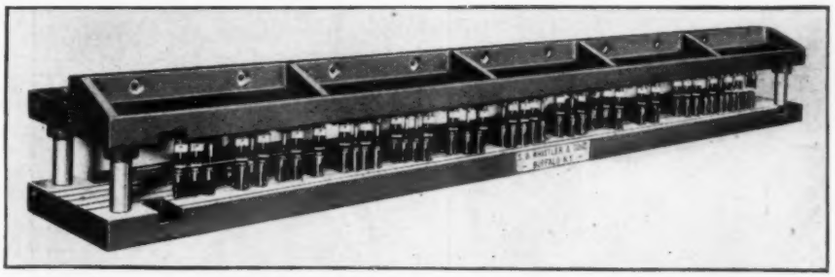
SLOTTING HEAD — *Special Machine Div., Experimental Tool & Die Co., 12605 Greiner Ave., Detroit, Mich.* Universal slotting head which can be used on all types of milling machines has a ram stroke adjustable from 0 to 4 in., with adjustment quickly and accurately accomplished. The head has four speeds from 50 to 250 or 100 to 580 strokes per min. Vol. 85, p. 88.



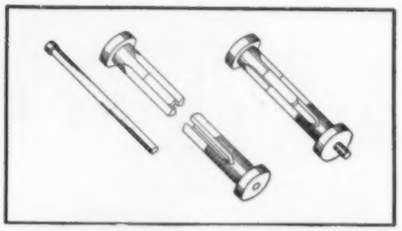
AUTOMATIC CONTROL UNIT—*Micromatic Hone Corp., 1345 East Milwaukee Ave., Detroit, Mich.* The "Micr-O-Size" automatic control unit generates accurate sizing within limits from 0.002 to 0.005 in. Vol. 85, p. 204.

TOOL GRINDING ATTACHMENT—*Super Tool Co., 21650 Hoover Road, Detroit, Mich.* Attachment for accurately grinding squares, hexagons and radial relief is readily adjustable to required diameters and can be used on a wide variety of work. Not shown. Vol. 85, p. 202.

DIE CUSHION—*Dayton Rogers Mfg. Co., 2830—13th Ave. South, Minneapolis, Minn.* The Model 2C self-contained pneumatic die cushion carries its own surge tanks. Made in sizes up to and including 24 in., it can be furnished in multiples of 2, 4 or 6, having maximum ring holding pressure up to and including 90 tons. Vol. 85, p. 836.

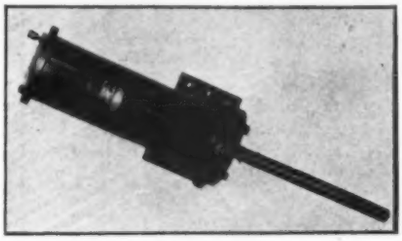


DIE SHOE—*S. B. Whistler & Sons, Inc., Buffalo, N. Y.* Used with adjustable perforating dies, this 120 × 18 in. die shoe cuts production time and expense. Set-up is particularly applicable to the aircraft industry, since it permits punching as many as 100 holes per stroke in aluminum alloy sheets. Vol. 85, p. 410.

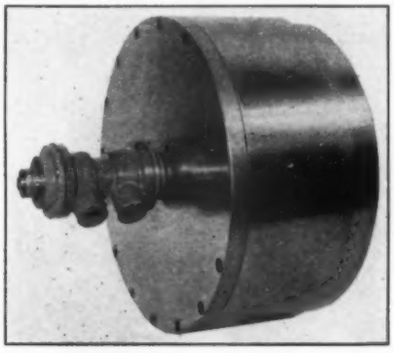


PUNCH AND DIE UNITS—*Durable Punch & Die Co., 2234–40 Ogden Ave., Chicago, Ill.* Holes up to ⅞ in. diameter in steel sheet three times as thick as the punch can be made with the "Durable" punch and die. Holes, which otherwise would be drilled or reamed, are pierced. Vol. 85, p. 192.

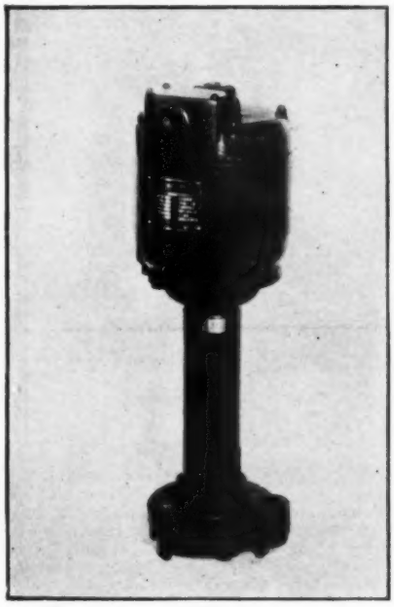
DIE CUSHION—*Dayton Rogers Mfg. Co., 2830 13th Ave. S., Minneapolis, Minn.* Model CCC pneumatic die cushions for heavy ring-holding pressure on large double-throw single-crank and double-crank presses, are furnished in double tandem units and have a combination regulating valve and pressure gage that controls and regulates all working draw ring holding pressures. Vol. 85, p. 566.

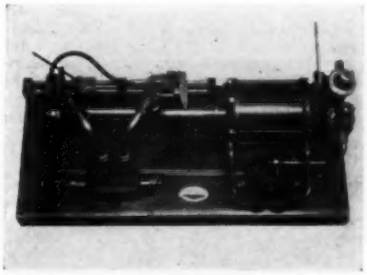


COUNTERBALANCE CYLINDER — *Dayton Rogers Mfg. Co., 2830 13th Ave. S., Minneapolis, Minn.* Designed for large, straight-side punch press equipment, a Model GT counterbalance cylinder is made in sizes from 6 to 14 in. diameter having strokes ranging from 12 to 24 in. Vol. 85, p. 674.



AIR CYLINDER—*Airgrip Chuck Division, Anker-Holth Mfg. Co., Port Huron, Mich.* This improved Model D Airgrip revolving air cylinder is suitable for use in connection with checks, fixtures, jigs and other machine tools. Vol. 85, p. 944.





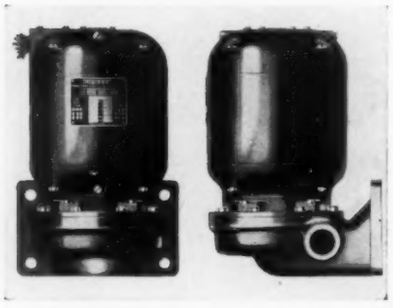
MATERIAL MEASURING UNIT—*J. N. Fauver Co., 91 Selden St., Detroit, Mich.* An accurately measured volume of viscous lubricant or plastic can be transferred from a container with this automatic measuring unit. Vol. 85, p. 207.

CENTRIFUGAL PUMPS — *Brown & Sharpe Mfg. Co., Providence, R. I.* With a depth of submergence of less than 10 in., furnished with a ¼-hp. motor and powered to handle liquids up to 1,000 s.s.u., the No. 206A motor-driven centrifugal pump is designed with a small diameter base so that it can be mounted in small, narrow tanks or in other places where space is limited. Vol. 85, p. 464.

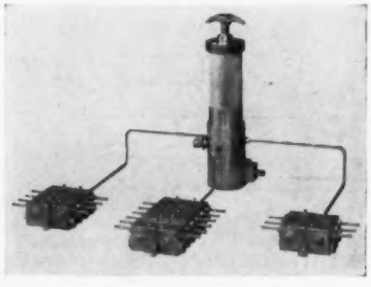
CENTRIFUGAL PUMPS — *Brown & Sharpe Mfg. Co., Providence, R. I.* Of compact design, the Nos. 225 and 245 centrifugal pumps have been developed for supplying coolant to machine tools where dirt, chips or abrasives may be present in the liquid. These pumps are also suitable for light transfer work. Vol. 85, p. 410.

TOOLS and ACCESSORIES—Coolant and Lubrication Equipment

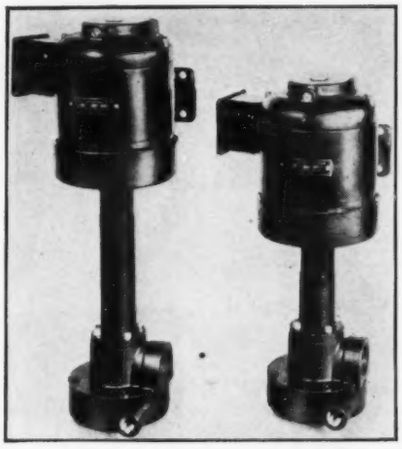
SIGHT-FEED LUBRICATOR — *Roto Co., 145 Sussex Ave., Newark, N. J.* This sight-feed lubricator for air-driven equipment operates successfully regardless of its position in the line. It can be turned in any position convenient for visibility, as it has no baffle. Only a single regulating valve is required. Vol. 85, p. 1172.



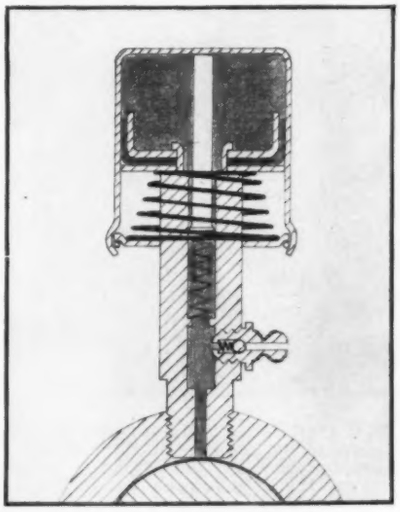
COOLANT PUMP—*Pioneer Engineering & Mfg. Co., 31 Melbourne Ave., Detroit, Mich.* Model VBA coolant pump is so compact that it can be located in positions impractical with other types. Vol. 85, p. 204.



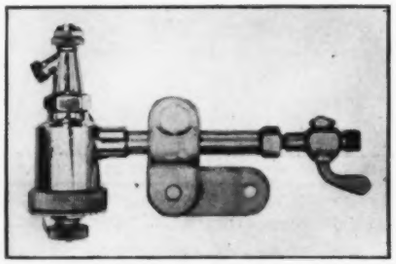
LUBRICATION DISTRIBUTOR — *Trabon Engineering Corp., 1814 E. 40th St., Cleveland, Ohio.* This lubrication system, adaptable for use with machine tools, has a reservoir of ½, 1 or 3 lb. capacity. Vol. 85, p. 204.



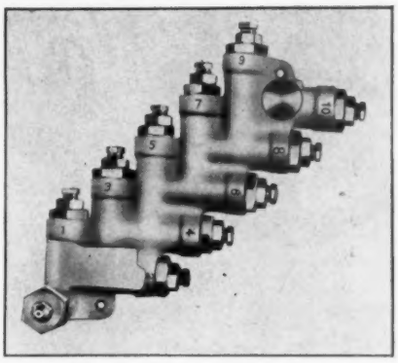
COOLANT PUMPS—*Eastern Engineering Co., 45 Fox Street, New Haven, Conn.* Two coolant pumps of compact design have a maximum capacity of 17 gal. per min. and a maximum pressure of 6 lb. per sq. in. One is 19¾ in. high and weighs 35 lb.; the other, 16¾ in. high, weighs 30 lb. Vol. 85, p. 1168.



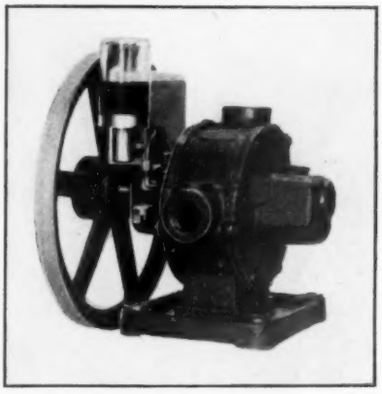
AUTOMATIC LUBRICATOR — *Ace Lubricating Equipment Co., 2345 W. Grand Blvd., Detroit, Mich.* The "Ace" automatic lubricator shows at a glance when refilling is necessary. This lubricator is filled from a gun and can be taken apart for cleaning. It can be adjusted to suit bearing fits and lubrication requirements. Vol. 85, p. 88.



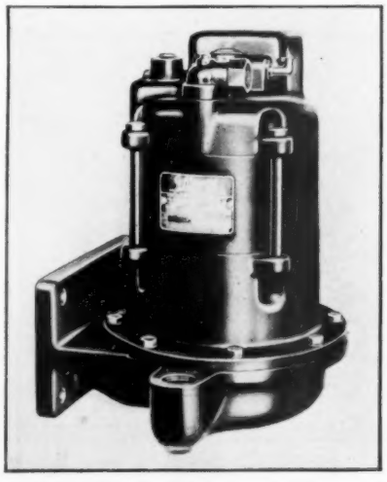
SPRAY LUBRICATORS—*Paasche Air Brush Co., 1909 Diversey Parkway, Chicago, Ill.* Lubricants containing dispersions of colloidal graphite can be automatically sprayed on working surfaces by these spray lubricating devices. Universal mounting makes it possible to adjust the lubricator to any desired position or angle. Vol. 85, p. 782.



PROGRESSIVE LUBRICATING SYSTEM — *Alemite Div., Stewart-Warner Corp., 1826 Diversey Parkway, Chicago, Ill.* From one central point the Alemite progressive lubricating system will deliver a pre-determined quantity of lubricant to from 3 to 20 bearings. Vol. 85, p. 736.

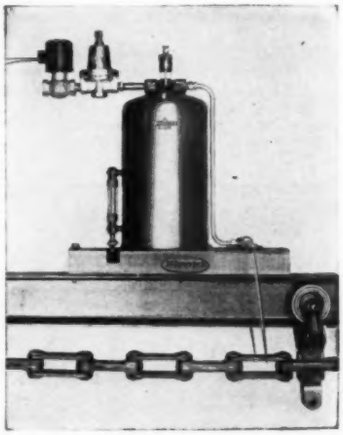


METERING LUBRICATOR — *Leiman Bros., Inc., 101-EE-7 Christie St., Newark, N. J.* Designed to handle light, heavy or medium viscosity oils, the automatic mechanical metering lubricator delivers oil according to the speed of the machine. Oil ceases to flow when the machine stops. Vol. 85, p. 462.

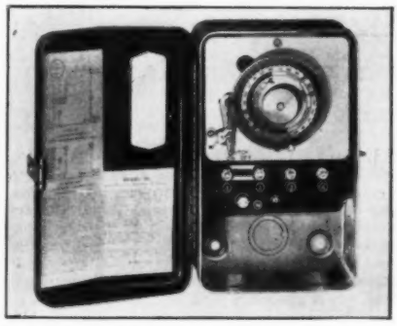


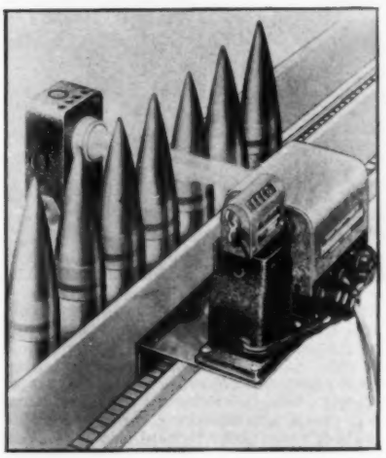
CENTRIFUGAL PUMP — *Gilbert & Barker Mfg. Co., Springfield, Mass.* This centrifugal pump unit has no metal-to-metal contact, and permits the handling of liquids charged with filings, small chips and abrasive impurities as large as 0.035 in. diameter. Capacity is 13 to 15 gal. per min. Vol. 85, p. 564.

PORTABLE COOLANT PUMP—*Gray-Mills Co., 213 W. Ontario St., Chicago, Ill.* Coolant flow control is provided by a wing nut in this portable coolant pump for use with lathes, drill presses, grinders, cut-off machines, hole milling machines and screw machines. For machines not equipped with a tray table, a Gray "Flo-Bac" tray provides for coolant return to the pump. Capacity of pump is 50 gal. per hour. Vol. 85, p. 1349.



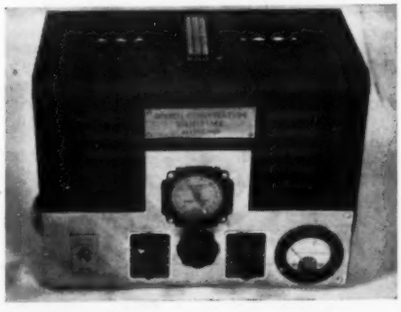
CONVEYOR LUBRICATOR — *J. N. Fauver Co., 49 W. Hancock Ave., Detroit, Mich.* This automatic conveyor chain lubricator consists of a 2-gal. tank hooked up with the plant air line. Air regulator set at 80 lb. pressure insures effective control and operation. Vol. 85, p. 630.





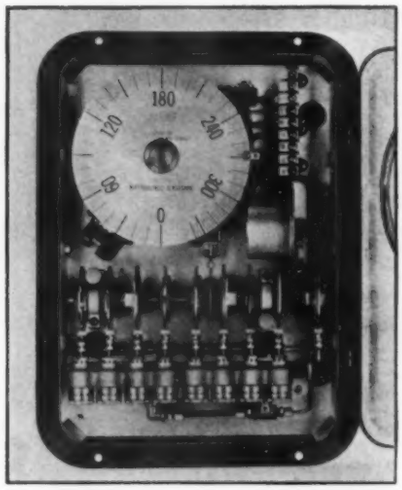
COUNTING UNIT—*Durant Mfg. Co., 1945-B No. Buffum St., Milwaukee, Wis.* Composed of three units: magnetic counter, photoelectric relay, and beam projector or light source, this photoelectric counting unit can be placed in an office where the record of production can be taken whenever desired. Counter has speed of 500 counts per minute. Vol. 85, p. 568.

ELECTRIC STOP WATCH—*Precision Scientific Co., 1750 N. Springfield Ave., Chicago, Ill.* For application in time study operations, laboratory procedures, motor dynamometer tests and others, the "Time-It" minute model electric stop watch is run by a synchronous electric motor which operates a direct-reading indicating counter. Vol. 85, p. 786.

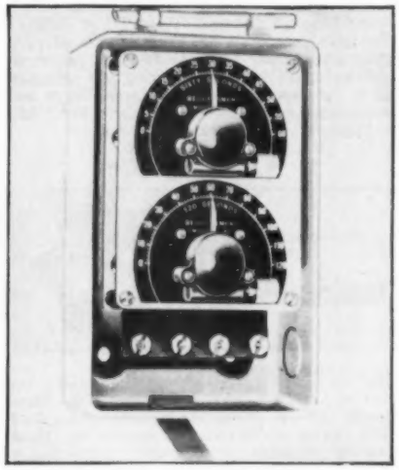


MOTOR TIMER—*Commonwealth Engineering Co. of Ohio, Dayton, Ohio.* Speed of synchronous electric motors can be varied and tested with the "Soren Varitime." The device provides an adjustable frequency from 18 to 240 cycles. Vol. 85, p. 41.

TIME SWITCHES — *Paragon Electric Co., 57 W. Van Buren St., Chicago, Ill.* Powered by a 450-r.p.m. self-starting synchronous motor, Series 300 electric time switches have been designed with a large factor of safety for operation under adverse conditions. Vol. 85, p. 416.

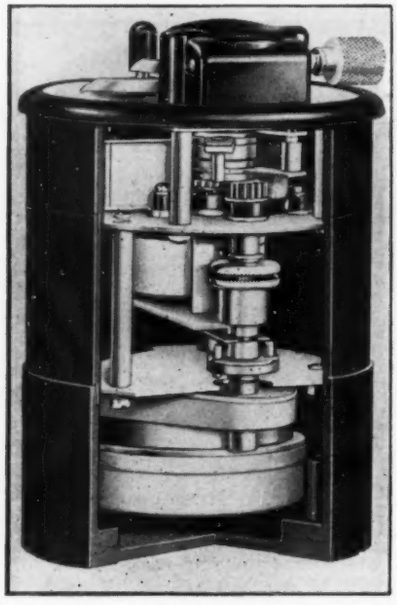


TIME CYCLE CONTROLLER—*Bristol Co., Waterbury, Conn.* The Model A-118 impulse-sequence cycle controller is for use where a number of factors must be timed. Vol. 85, p. 834.

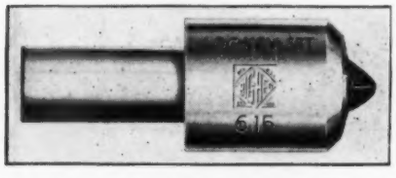


DOUBLE RESET TIMER — *R. W. Cramer Co., Centerbrook, Conn.* This automatic double reset timer consists of two conventional reset timer mechanisms mounted on a panel and controlling common circuits. Vol. 85, p. 136.

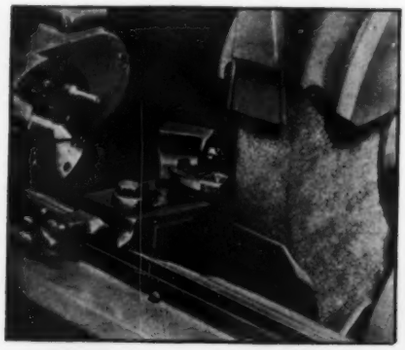
PROGRAM CLOCK—*Montgomery Time Systems, Owensville, Ind.* On the Model E-2 Memo program clock slots permit operations at 5-min. intervals throughout 24 hours. Vol. 85, p. 734.



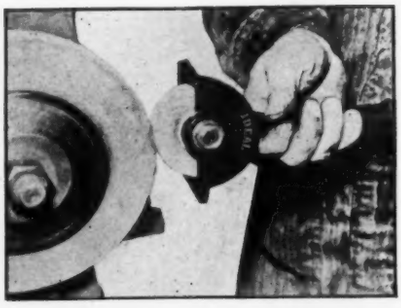
TIME RELAYS—*R. W. Cramer Co., Centerbrook, Conn.* The Type RS1C time relay is used to keep electrical circuits closed for a preset time interval and Type TD1C for opening the circuit for a selected interval. Timers have an instantaneous reset features. Vol. 85, p. 1120.



DRESSER NIBS—*Diamond Tool Co., 41st St. at Ellis Ave., Chicago, Ill.* Diamonds set in "Big-Hed" nibs will not shift, turn or loosen in operation, thus making possible micrometer adjustment of each pass. Seating for the diamond consists of two internal locking keys integrally cast on slug-holding nib by forcing the molten metal into two internal key seats milled in the nib head. Vol. 85, p. 1350.



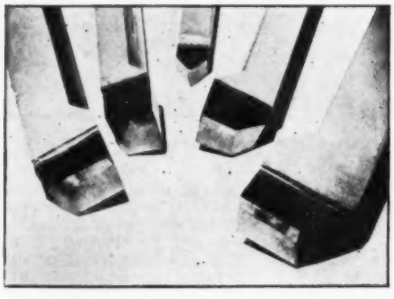
WHEEL TRUING ATTACHMENTS—*Brown & Sharpe Mfg. Co., Providence, R. I.* Radius wheel truing attachments, which fit Nos. 5, 10, 12, 20, 22 and 23 grinding machines, form wheels for grinding to shoulders where a fillet is required. They permit shaping either the right-hand or left-hand corner of the grinding wheel to any convex radius from 0 to ½ in. Vol. 85, p. 832.



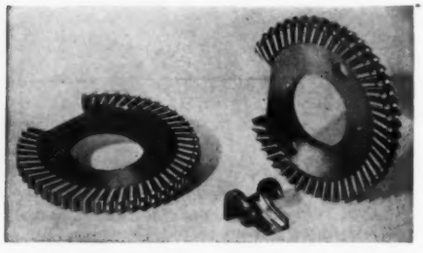
GRINDING WHEEL DRESSER — *Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* The cutting wheel of this abrasive wheel-type, grinding wheel dresser is held in a protective metal housing which deflects the grindings away from the operator. Large handle makes it convenient to hold and use. Vol. 85, p. 1292.

PRECISION GRINDING WHEEL—*Abrasive Co., Philadelphia, Pa.* The "SB-Borolin" precision grinding wheel has been developed for use on Brown & Sharpe surface grinding machines. This wheel measures 7 × ½ in., and has a 1¼-in. hole bushed with a wear-resistant material. Not shown. Vol. 85, p. 205.

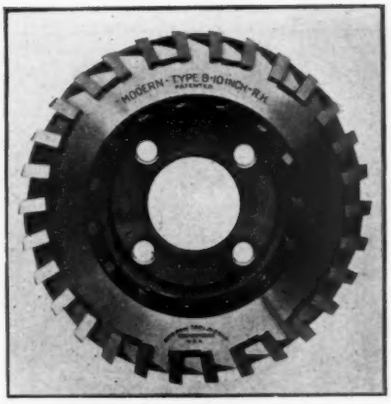
POLISHING WHEELS — *Weldon Roberts Rubber Co., 351 Sixth Ave., Newark, N. J.* "Brightboy" disks and polishing wheels quickly erase marks from welds on stainless steel, leaving a bright, clean surface. Not shown. Vol. 85, p. 369.



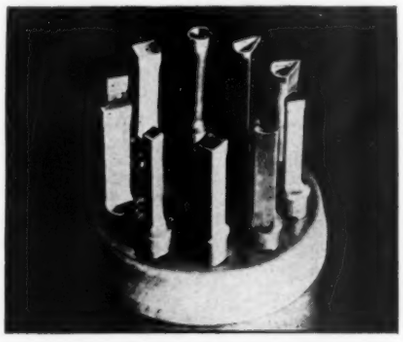
OFFSET TOOLS—*Carboloy Co., 11149 E. Eight Mile Rd., Detroit, Mich.* Five new styles of standard tools are available in a total of 21 sizes. These tools comprise four offset types and a two-way square-shank turning style. Each type, except the last, is available in two grades, one for steel cutting and one for cast iron. Vol. 85, p. 408.



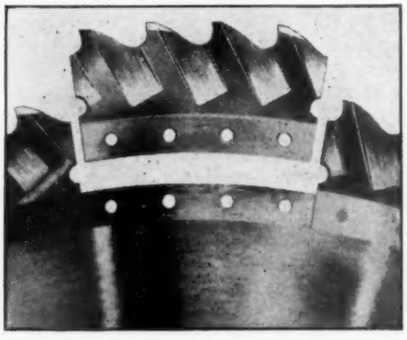
CIRCULAR BROACH — *National Broach & Machine Co., 11457 Shoemaker St., Detroit, Mich.* The "Red Ring" circular broaches cut circular T-slots in a single revolution and at a production rate of approximately 100 per hour. Vol. 85, p. 200.



INSERTED-BLADE CUTTER — *Modern Tool Works, Rochester, N. Y.* Stop pins in the cutter body of the Types B and C inserted blade milling cutters form a positive lock and prevent the blade from changing position. Vol. 85, p. 266.

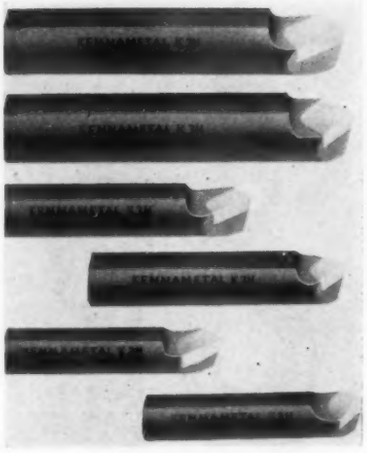


SLOTTING TOOLS — *Experimental Tool & Die Co., 12605 Greiner, Detroit, Mich.* An assortment of ten high-speed tools is announced as accessories to the Universal Slotmaster (described A. M. Vol. 85, p. 88). Vol. 85, p. 676.

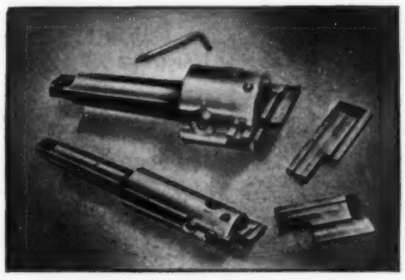


SEGMENTAL COLD SAWS—*E. C. Atkins & Co., 402 S. Illinois St., Indianapolis, Ind.* Relief grinding has improved this line of segmental cold saws. It consists of an additional grind along the side of each individual tooth at an angle slightly greater than the angle of the tooth. Damage to a single tooth or group of teeth is repaired by merely affixing a new segment to the blade. Vol. 85, p. 1350.

BLADE REAMER—*Barber-Colman Co., Rockford, Ill.* With these reamers, which are equipped with Carboloy tipped blades, the center hole of aluminum washing machine gyrators is reamed at a spindle speed of 350 r.p.m. with the reamer fed by hand. Production is 40 pieces per hour, with 50,000 pieces for each sharpening. Not shown. Vol. 85, p. 201.



BORING TOOLS — *McKenna Metals Co., 103 Lloyd Ave., Latrobe, Pa.* Style 27-R and 29-R Kennametal tipped tools with round shanks for use in 30 deg. and 45 deg. boring bars are suitable for precision boring and finishing cuts. Vol. 85, p. 1020.

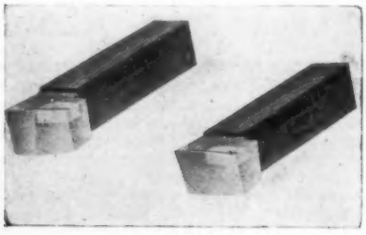


SPOTFACER AND BORING TOOL—*Bokum Tool Co., Detroit, Mich.* Made in three models with standard blades providing a range of boring diameters up to 22 in. and offering a wide range of spotfacing, the new B & B spotfacer and boring tool performs a wide variety of operations. This tool can be used for boring long holes in either forward or inverted direction. Vol. 85, p. 834.

BORING BITS—*McKenna Metals Co., 103 Lloyd Ave., Latrobe, Pa.* A standard type of carbide-tipped boring bit that will give efficient service on most steel boring operations, while requiring minimum grinding alterations for special boring jobs, has a 12-deg. positive back rake. Right and left-hand tools for six standard styles of boring bits are available. Not shown. Vol. 85, p. 522.

CARBIDE TIPPED TOOLS—*Tungsten Carbide Tool Co., 7171 E. McNichols Rd., Detroit, Mich.* Suitable for cast iron non-ferrous metals and steel, this line of standard tools comprising 6 styles and 46 sizes, covers most turning, boring and facing requirements. All tools are carbide tipped, have diamond-ground edges and are ready for immediate use. Vol. 85, p. 1176.

DOUBLE JUMP BROACH — *National Broach & Machine Co., 11457 Shoemaker St., Detroit, Mich.* The "Red Ring" double-jump broach has been developed for cored and pierced holes in castings and forgings which require relatively heavy cuts to keep the cutting edges of the broaches below hard surface scale. Vol. 85, p. 202.

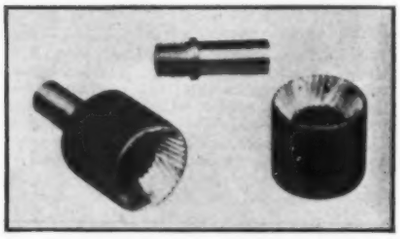


TURRET LATHE TOOLS — *McKenna Metals Co., 103 Lloyd Ave., Latrobe, Pa.* Tools for facing operations in turret lathes have been added to the line of "Kennametal" tools. These tools have 6 deg. side and front clearance angles, 8 deg. end cutting edge angles, 6 deg. side rake and 2 deg. negative back rake. Vol. 85, p. 208.

SLOTTING CUTTER — *Barber-Colman Co., Rockford, Ill.* An interlocking slotting cutter 8-in. in diameter cutting a slot 2½ in. long 1¼ in wide and 1¹³⁄₁₆ in. deep is fed at 2.36 in. per min. and run at a speed of 31 r.p.m. With this set-up approximately 13 pieces are milled per hour. Vol. 85, p. 201.

HACKSAW BLADES—*Capewell Mfg. Co., Hartford, Conn.* Five types of metal cutting saw blades are "Technite" blades, recommended for high-speed, stainless and other hard-to-cut alloy steels; "Tunghard" for general service where fast speeds are not essential; "Tungflex" with a flexible back for cutting in difficult positions; "FleXloy" for general purposes. Not shown. Vol. 85, p. 94.

HACKSAW BLADE—*Millers Falls Co., Greenfield, Mass.* A heat-treating technique which leaves the teeth hard and the ends and center soft gives the "Blu-Mol" hacksaw blade twice conventional blade life. Not shown. Vol. 85, p. 143.

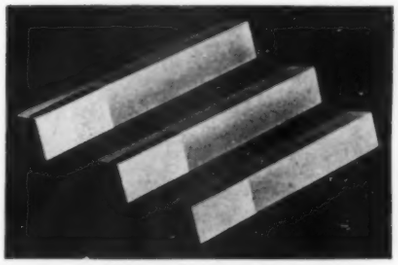


DEBURRING CUTTER — *Severance Tool Mfg. Co., 1520 E. Genesee Ave., Saginaw, Mich.* A cutting tool for deburring ends of rods and tubing is available with standard mouth angles of 30 and 45 deg. Vol. 85, p. 274.

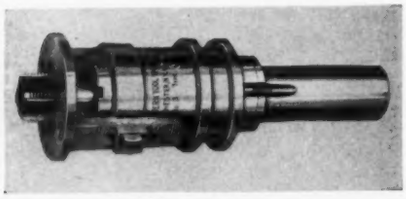
KENNAMETAL TOOLS — *McKenna Metals Co., 103 Lloyd Ave., Latrobe, Pa.* A greater thickness of steel under the cutting point of the tip is permitted by the position of the tip in the shank of the standard series of Kennametal tools available in all turning and facing styles and in all shank sizes from 1 in. up. Not shown. Vol. 85, p. 1352.

HACKSAW BLADE — *Victor Saw Works, Inc., Middletown, N. Y.* The Victor Unbreakable special flexible tungsten alloy hacksaw with cutting qualities of all-hard tungsten blades, so flexible that it cannot be broken in a frame, is said to obtain its combination of opposing qualities through the use of a new tungsten alloy, heat-treated by a recently developed process. Not shown. Vol. 85, p. 32.

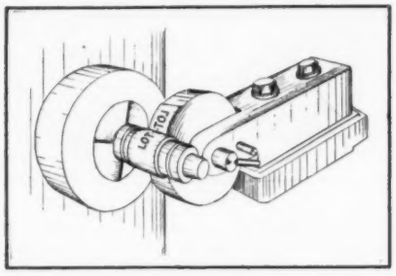
DRILLS—*Black Drill Co., Cleveland, Ohio.* "Hardsteel" drills for drilling holes in hardened steel are available in sizes from 3/8 to ½ in. of solid "Hardsteel" metal with straight shanks, or from ½ to 1½ in. tipped with "Hardsteel" metal. Not shown. Vol. 85, p. 207.



TANTUNG BLADES AND TOOLS—*Vascoloy-Ramet Corp., North Chicago, Ill.* Increased output of operations through higher cutting speeds and longer runs per tool grind are accomplished with milling cutter blades and all-purpose tools being manufactured from Tantung "G", a non-ferrous tool alloy containing tantalum carbide. Vol. 85, p. 1172.

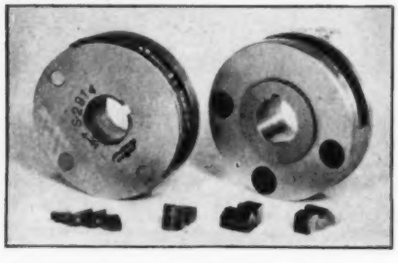


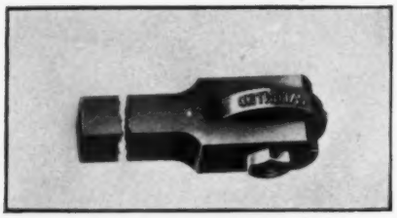
COLLAPSIBLE TAP — *Modern Tool Works Div., Consolidated Machine Tool Corp., Rochester, N. Y.* Stationary or rotary collapsible taps for use on turret lathes, hand screw machines and drill presses are available in sizes from ⅛ to 3¼ in. diameter, with each size having a wide threading range. Vol. 85, p. 201.



ROLLER MARKING DIE — *New Method Steel Stamps, Inc., 143 Jos Campau St., Detroit, Mich.* Various forms of holder shanks are available for the rotary or roll-type marking device, with solid die, developed especially for marking parts such as shells or other ordnance units, indexing rolls, etc., while being produced on automatic screw machines or lathes. Vol. 85, p. 514.

ROLLER MARKING DIE—*M. E. Cunningham Co., 160 East Carson St., Pittsburgh, Pa.* Time of marking mill rolls can be reduced from about 8-hr. to 30-min. with this floating type roll brander. Roll and holder are of one-piece construction. Vol. 85, p. 272.



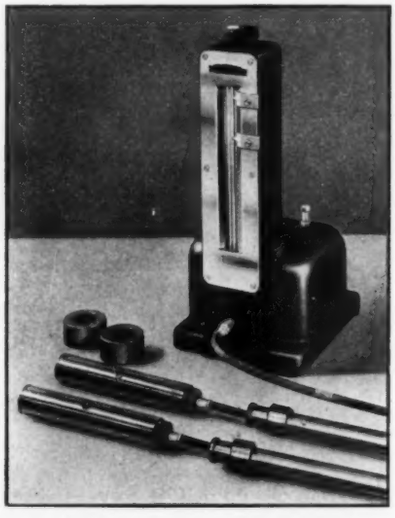


ROLLER MARKING DIE—*Acromark Corp., 245 N. Broad St., Elizabeth, N. J.* Parts turned in lathes can be quickly marked with this roller die and holder. Steel die can be engraved with any numbering, lettering or design. Vol. 85, p. 184.

IMPROVED KENNAMETAL — *McKenna Metals Co., 103 Lloyd Ave., Latrobe, Pa.* Greater hardness and strength than previously is offered in Kennametal Grades KM, KH, K3H and K4H steel-cutting tool carbides. Not shown. Vol. 85, p. 838.

CUTTING TOOLS—*Fansteel Metallurgical Corp., North Chicago, Ill.* "Tantung G Economy" tools for general purpose use are recommended where higher cutting speeds than are possible with high-speed steel are desired, or where machines have not sufficient speed, power or rigidity to permit use of cemented-carbide tools. Not shown. Vol. 85, p. 141.

COMPOSITE CUTTER BLANKS—*The Forging & Casting Corp., Ferndale, Mich.* Blanks for dovetail forming cutters are made by welding a cutting face of high-speed steel to a non-hardenable base of mild steel. Not shown. Vol. 85, p. 1002.



AIR BORE GAGE—*Sheffield Corp., Dayton, Ohio.* The "Precisionaire" flow-type air gage has been developed for checking gun bores to eliminate the necessity for high operative skill, maintain maximum precision standards and materially increase inspection speed. Vol. 85, p. 34.

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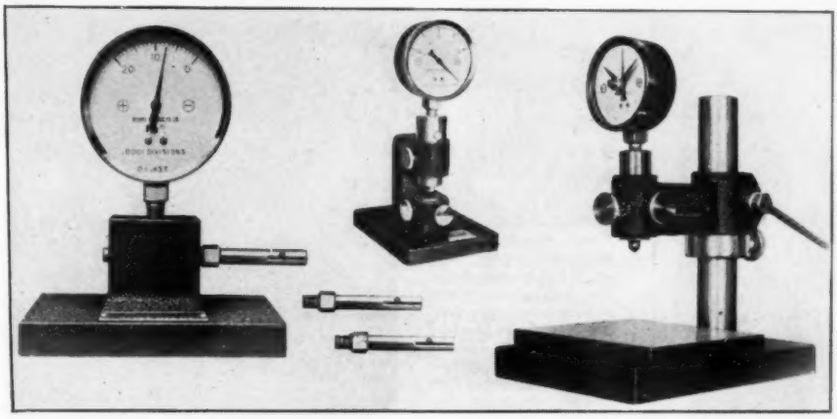
ROLLER MARKING DIE — *New Method Steel Stamps, Inc., 143 Jos. Campau St., Detroit, Mich.* A rotary or roll-type marking device in which the letters or figures are interchangeable is designed for rapidly and automatically marking cylindrical parts in production, including shell and other ordnance units. Vol. 85, p. 678.

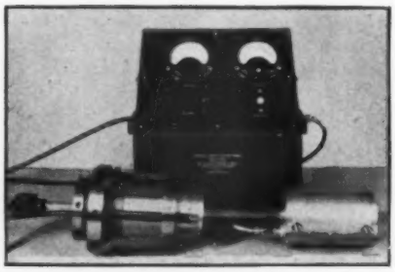
COMPARITOL—*George Scherr Co., 128 Lafayette St., New York, N. Y.* Used on plug gages, bearings, pins and ball bearings the Model 8 Comparitol, designed especially to measure and inspect large, heavy, precision work up to 8 in. in diameter, has scales reading to 0.0001 or to 0.00005 in. Vol. 85, p. 1074.

SURFACE ANALYZER—*Brush Development Co., 3311-25 Perkins Ave., Cleveland, Ohio.* Prominent among the improvements of the No. SA-2 surface analyzer is the use of a diamond tracer point instead of sapphire, and the placement of this point ahead of the positioning shoe to permit checking into smaller corners, such as gear teeth. Several accessories have been developed for use with this analyzer. Vol. 85, p. 314.

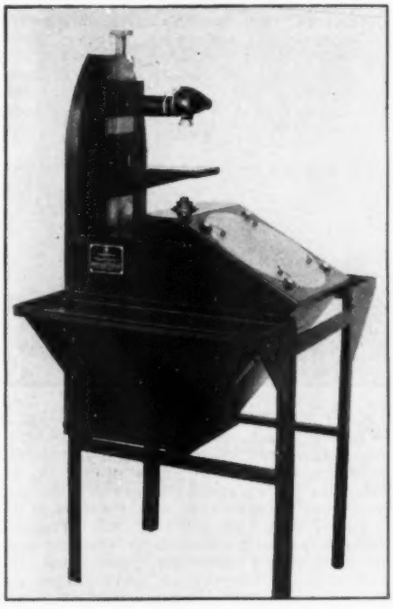
PROFILOMETER—*Physicists Research Co., 343 S. Main St., Ann Arbor, Mich.* Roughness ratings can be read directly in true inch units with the Type P profilometer. Full scale ranges of 3, 10, 30, 100, 300 and 1,000 micro-inches are supplied. A special tracer is used on inside diameters down to ½ in. Vol. 85, p. 1300.



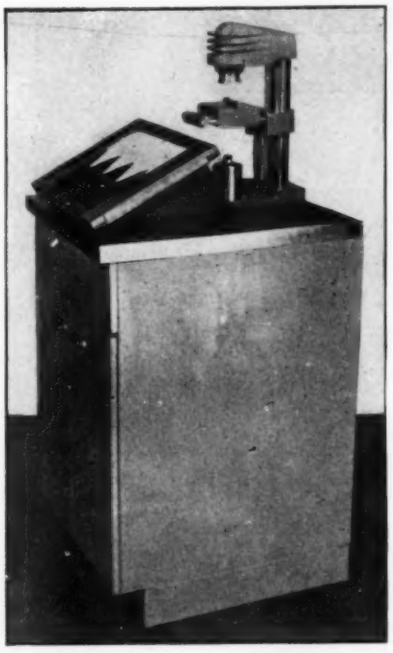
PNEUMATIC GAGING EQUIPMENT—*Moore Products Co., H and Lycoming Sts., Philadelphia, Pa.* Small dimensional differences are accurately amplified and shown on a dial indicator by pneumatic comparator gaging equipment. In operation a restricted amount of air from a filtered and regulated source of supply is admitted to the dial gage and measuring nozzle. A circular chart recording meter can be used to provide a permanent record. Vol. 85, p. 1346.



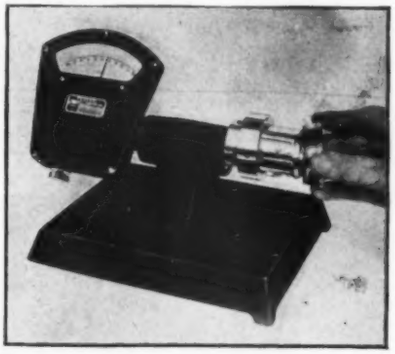
HASKELL INDICATOR — *Baldwin-Southwark Division, Baldwin Locomotive Works, Philadelphia, Pa.* The Haskell gun bore straightener indicator, offered in sizes from 37-mm. upward, will detect an eccentricity of 0.005 in. or less, depending on the concentricity of the roller tracks with the ends of the bore. Vol. 85, p. 996.



COMPARATOR—*Jones & Lamson Machine Co., Springfield, Vt.* For checking small flat objects which can be placed directly on a glass stage, the vertical optical comparator projects a greatly enlarged shadow of the contour onto a screen, where its outline can be compared with one on the screen itself. This all-metal machine will project a maximum diameter of 1.5 in. with a 6X magnification, and a 0.140 in. diameter with 100X magnification. Vol. 85, p. 86.

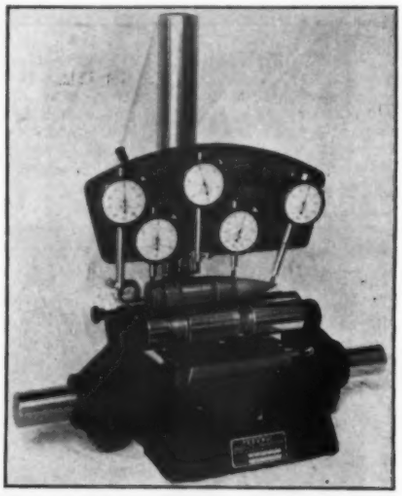


COMPARATOR — *Portman Machine Tool Co., 19 Beechwood Ave., Mount Vernon, N. Y.* Staging and holding fixtures have been eliminated in this optical projector which has standard magnifications of 10, 20, 30, 45, 60, 80 and 100. Vol. 85, p. 944.

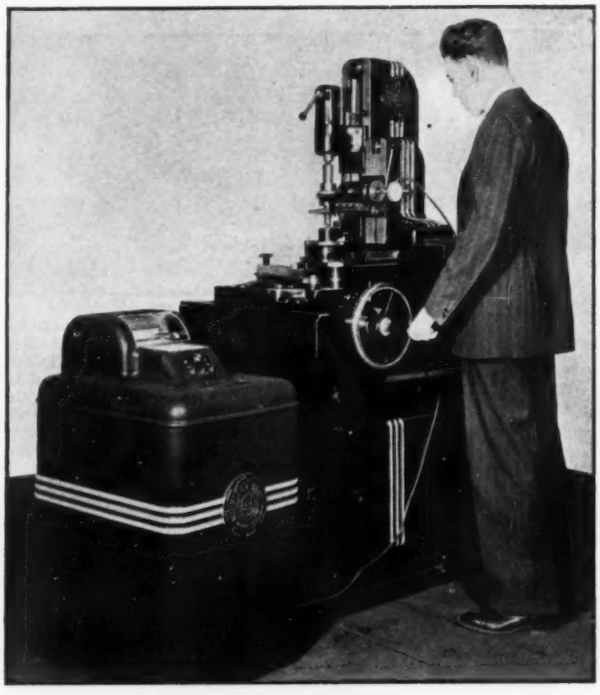


BENCH TYPE PLUG GAGE—*Federal Products Corp., 1144 Eddy St., Providence, R. I.* The Model 1202 B-5 bench-type plug gage has been developed to handle the same type of work as a fixed type plug gage but with the advantages of speed and certain inspection of a dial indicator gage. The indicator on this gage reads to 0.00005 in.; readings of 0.000025 in. can be estimated. Vol. 85, p. 412.

RIFLE BORE GAGE—*Federal Products Corp., 1144 Eddy St., Providence, R. I.* This Model G3F P-28 rifle and gun gage checks both lands and grooves of gun barrel rifling. The head of this instrument consists of three sensitive contact points, and three guide points. Vol. 85, p. 318.

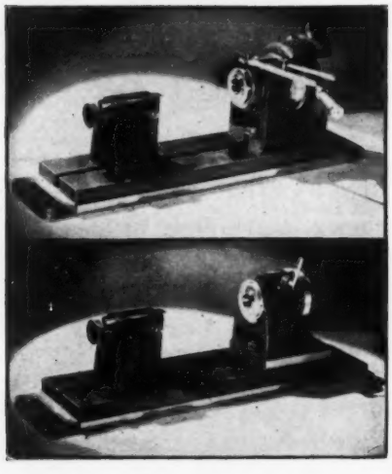


MECHANICAL SHELL CHECKER—*Federal Products Corp., 1144 Eddy St., Providence, R. I.* An entirely mechanical gage for checking shell is independent of electrical or air line connections. Piece is cradled in roller V-blocks. Vol. 85, p. 1074.

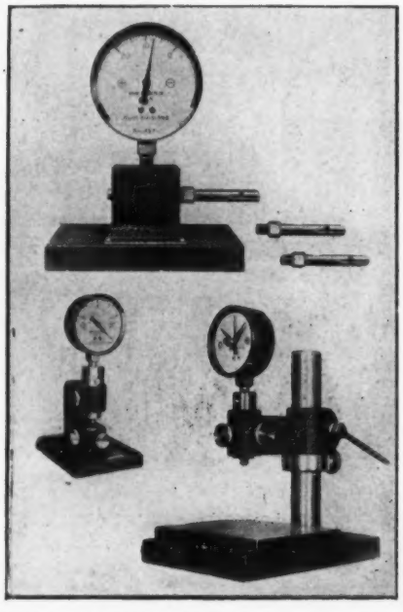


GEAR CHECKING RECORDER — *Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich.* This recorder, operating on a new principle for gear recording devices, can be coupled to any Michigan "Sine-Line" lead checker or involute checker for gears or hobs by simple changes to provide for the required electrical connections. Vol. 85, p. 458.

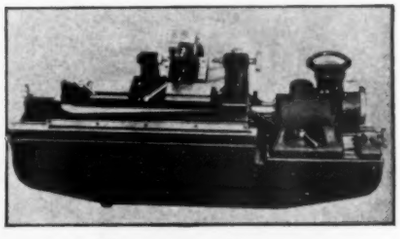
UNIVERSAL INTERNAL COMPARATOR—*Pratt & Whitney, Div. Niles-Bement-Pond Co., West Hartford, Conn.* Internal dimensions from ½ to 10-in. diameters can be measured with the "Electrolimit" universal internal comparator. By taking ordinary precautions in such essential details as cleanliness, temperature and operating technique, this comparator may be read within an accuracy of 0.00002 in. Vol. 85, p. 561.



COLLET INDEX FIXTURES—*Hardinge Bros., Elmira, N. Y.* The Type H-4 horizontal collet index fixture was designed for use in toolroom and inspection departments. The No. HV-4 horizontal vertical collet index fixture is designed particularly for use in production departments. Vol. 85, p. 462.

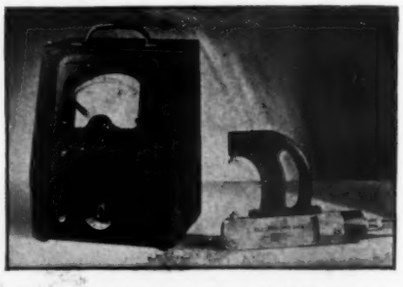


PNEUMATIC COMPARATOR GAGE —*Moore Products Co., H and Lycoming Sts., Philadelphia, Pa.* A pneumatic comparator gaging method which accurately amplifies small dimensional differences and shows them on a dial type indicator has measuring points which are actually air nozzles, do not touch the piece being gaged, and accordingly do not wear. Vol. 85, p. 832.

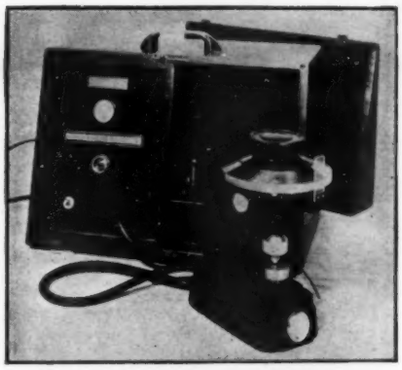


LEAD TESTING MACHINE—*Pratt & Whitney, Div. Niles-Bement-Pond Co., West Hartford, Conn.* This lead testing machine will handle parts up to 4¾-in. diameter with a thread length of 4 in. and an over-all length of 8 in. It will read accurately to within 0.000025 in. Tapered threads as well as straight threads may be checked by correctly positioning the swivel work supporting table. This device is a direct reading instrument, not a comparator. Regular equipment includes a set of seven ball points for 4 to 80 threads per inch. Vol. 85, p. 561.

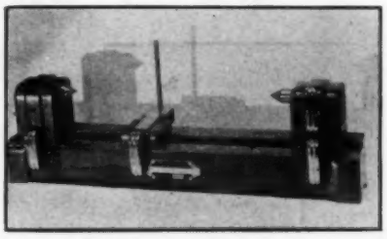
THICKNESS GAGE—*General Electric Co., Schenectady, N. Y.* Thicknesses up to 1½ in., depending upon the electrical resistivity of the metal, can be measured within an accuracy of 5 percent with the electric gage designed for measuring the wall thickness of hollow aluminum airplane propellers, brass sheeting, copper tanks and large pipes. Vol. 85, p. 562.



ELECTROLIMIT SNAP GAGE—*Pratt & Whitney, Div. Niles-Bement-Pond Co., West Hartford, Conn.* Advantages of both a comparator and a snap gage are combined in the "Electrolimit" snap gage. Personal errors are eliminated, gage is light and easy to handle, and electric circuit amplifies any errors into an easily read needle movement on a dial. Two gage bodies and several frame sizes permit checking diameters from ½ to 6 in. Vol. 85, p. 561.

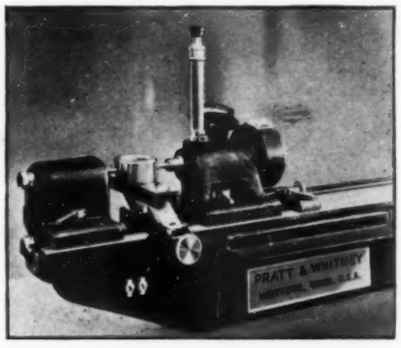


RUBBER MICROMETER—*Instrument Specialties Co., Inc., 240 Bergen Blvd., Little Falls, N. J.* The Carson rubber micrometer measures soft or compressible materials with a high degree of precision. Two standard dials are available: a 2½-in. dia. dial with divisions of 0.0001 in., and a 4½-in. dia. dial with divisions for every 0.00005 in. The larger dial has a vernier permitting accurate adjustments to a fraction of a division. Vol. 85, p. 830.

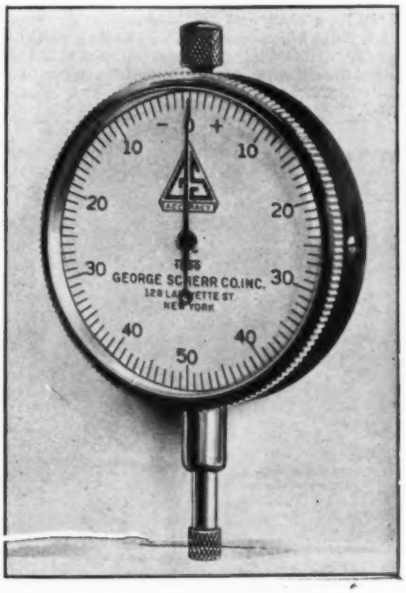


BENCH CENTER—*Barber-Colman Co., Rockford, Ill.* An improved bench center for inspecting a wide variety of small work up to 6½ in. dia. by 18 in. long, provides an accurate, fast method for inspecting cylindrical and circular pieces. Vol. 85, p. 570.

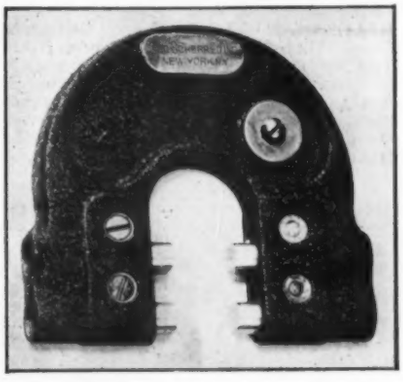
SHEET STEEL GAGE—*General Electric Co., Schenectady, N. Y.* A magnetic gage which measures the thickness of sheet steel when only one side is accessible consists of a 7-lb. portable indicating unit connected to an electric outlet, and a small cylindrical head containing an Alnico magnet. Vol. 85, p. 366.



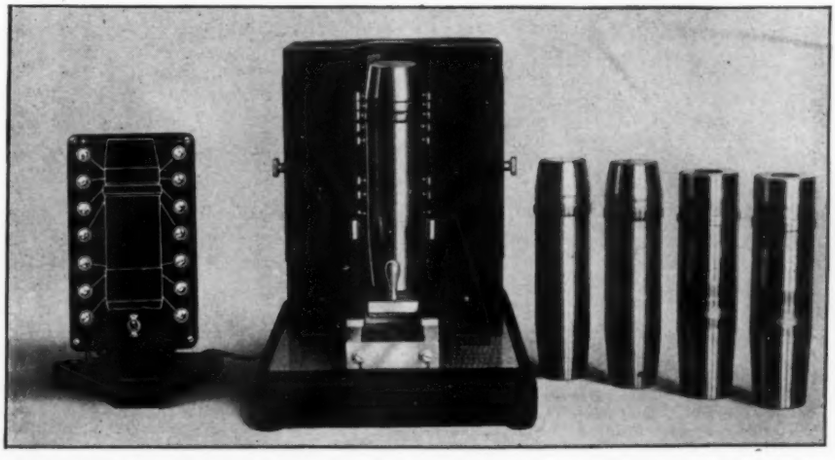
STANDARD MEASURING MACHINE—*Pratt & Whitney, Div. Niles-Bement-Pond Co., West Hartford, Conn.* This standard measuring machine, which reads directly to 0.00001 in., can be used for checking any physical dimension within the range of the instrument. The machine consists essentially of a master bar, a dividing screw, and a means of controlling measuring pressure, all mounted on a rigid bed. Vol. 85, p. 561.



DIAL INDICATOR—*George Scherr Co., 128 Lafayette St., New York, N. Y.* The "GS" dial indicator has a simplified lever movement. The dial is graduated in 0.001 in. with a plunger travel of ⅜ in. Vol. 85, p. 34.



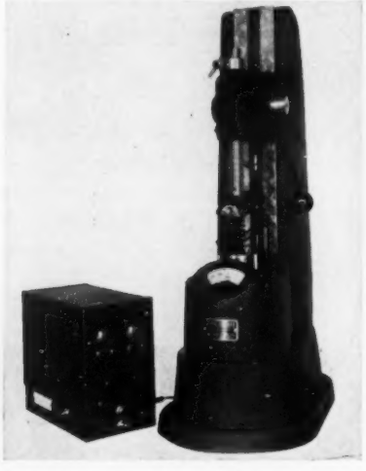
ADJUSTABLE-LIMIT SNAP GAGES—*George Scherr Co., 128 Lafayette St., New York, N. Y.* Model A and Model C adjustable limit snap gages are available to gage parts up to 6 in. across. Vol. 85, p. 1296.



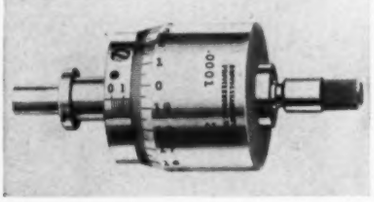
MULTIPLE-DIAMETER GAGES—*Pratt & Whitney, Div. Niles-Bement-Pond Co., West Hartford, Conn.* By watching pairs of red and green lights, an inspector using one of the multiple electric contact gages can tell instantly in one operation if any section of a part is too small, too large, or within the specified limits. Vol. 85, p. 83.

DIAL INDICATORS—*B. C. Ames Co., Waltham, Mass.* Four sizes of indicators with a choice of fourteen different dial numberings indicating tenths of thousandths, half thousandths, and thousandths of the inch or thousandths and hundredths of millimeters are available in the "Hundred Series" dial indicators. Vol. 85, p. 318.

DIAL SNAP GAGE—*Federal Products Corp., 1144 Eddy St., Providence, R. I.* The Model 264P dial indicator snap gage is suitable for much the same type of work as the familiar "go and not-go" gage, with the advantages of greater speed, increased accuracy and freedom from the human element. Vol. 85, p. 410.

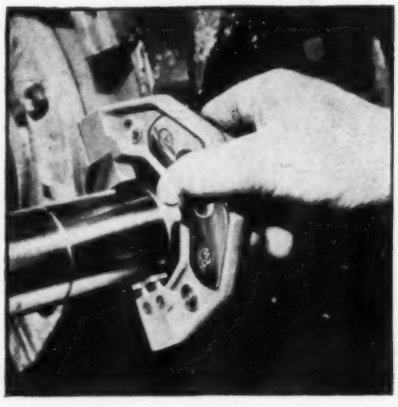


SPRING CHECKER—*Link Engineering & Mfg. Co., 1054 W. Baltimore Ave., Detroit, Mich.* Three capacities, 10, 50 and 250 lb., are available in the Model PB4 spring checker for testing compression springs, and the Model PB4-D for testing tension springs. Vol. 85, p. 206.



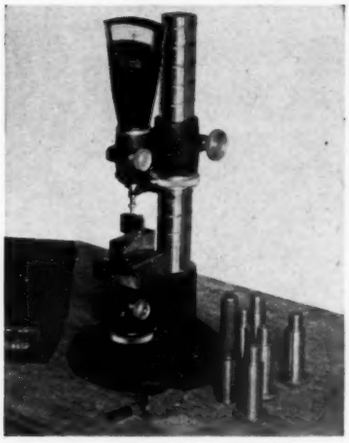
MICROMETER HEAD — *Brown & Sharpe Mfg. Co., Providence, R. I.* The No. 293RS ½-in. micrometer head has a measuring screw, English measure, of 50 threads per inch and a thimble of 200 graduations which read directly to 0.0001 in. The metric screw is of ½-mm. pitch; the 200 graduations read direct to 25 ten-thousandths of a millimeter. Vol. 85, p. 202.

DIAL SNAP GAGE—*Standard Gage Co., Poughkeepsie, N. Y.* Tolerances of the order of 0.0001 in. are maintained through use of dial snap gages. Eight sizes cover all dimensions up to 4½ in. Vol. 85, p. 202.

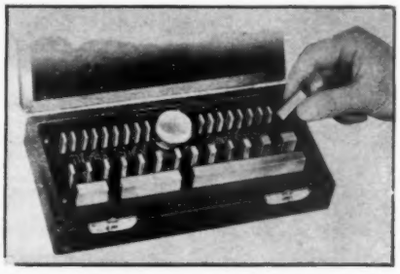


ADJUSTABLE-LIMIT SNAP GAGES —*Pratt & Whitney, Div. Niles-Bement-Pond Co., West Hartford, Conn.* "Trusform" Model C adjustable limit snap gages permit inspecting work in one hand operation. Bakelite grips, molded to conform to the fingers, are supplied to insulate the gages from the heat of the operator's hand. Vol. 85, p. 508.

MIDGET INDICATOR — *Standard Gage Co., Poughkeepsie, N. Y.* A universal midget indicator contains a completely geared and fully jeweled transmission, without any cam or lever action. Length, 2⅝ in.; over-all width, 1⅜ in.; dial diameter, 1 in.; weight, 2 oz. Several types of holding accessories are available. Vol. 85, p. 201.

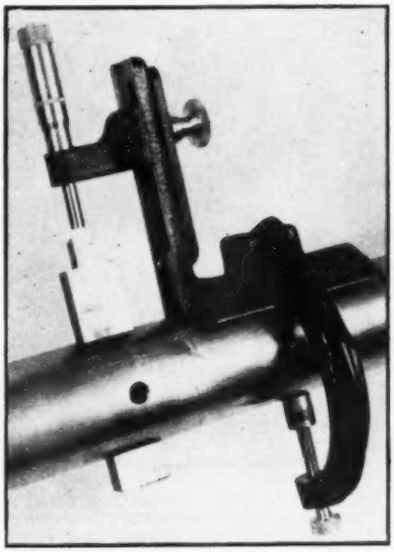


COMPARITOL—*George Scherr Co., 128 Lafayette St., New York, N. Y.* The "Comparitol" precision measuring instrument works on a new knife-edge principle. This instrument may be used to inspect and check mass-produced parts for interchangeable manufacture. Vol. 85, p. 200.



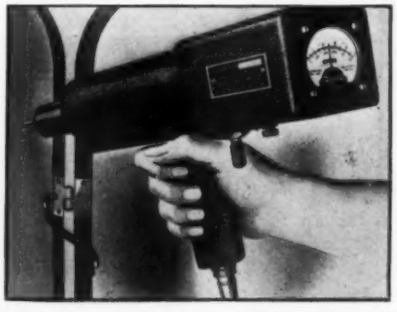
PRECISION GAGE BLOCKS—*George Scherr Co., 128 Lafayette St., New York, N. Y.* The Ultra-Chex Inspectoset, consisting of 34 gage blocks, will make up about 80,000 combinations in steps of 0.0001 in. from 0.300 in. to 8 in. Vol. 85, p. 898.

ILLUMINATED MAGNIFIER—*George Scherr Co., 128 Lafayette St., New York, N. Y.* The "Magni-Ray" wide-field illuminated magnifier for use in inspection of small parts is available in two models. One has an achromatic lens providing a 2-in. field at 3 × magnification, while the other has a 3-in. lens with a power of 1½ ×. Vol. 85, p. 272.

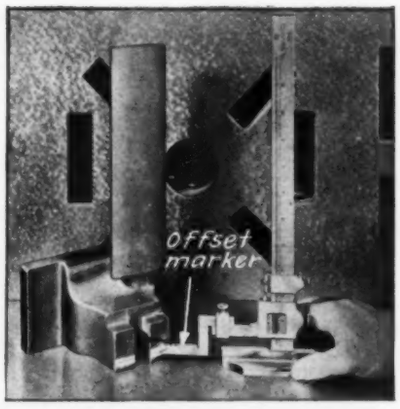


TOOL SETTING GAGE—*Bartelt Engineering Co., Beloit, Wis.* This gage for setting the cutter on boring bars eliminates guess work in setting tools not equipped with micrometer instruments. Clamps are supplied to fit bars from 1 to 5 in. in diameter. Vol. 85, p. 1074.

PRECISION THREAD GAGES—*Detroit Tap & Tool Co., 8432 Butler Ave., Detroit, Mich.* Internal and external threads on shell can be checked by means of these precision thread gages. Plug gages are reversible; ring gages may be reconditioned and reset. Vol. 85, p. 1004.



ELECTRIC BOND TESTERS—*Shallcross Manufacturing Co., Collingdale, Pa.* Two electric bond testers have been designed to test electrical connections which minimize resistance in the mechanical joints. One model, the Aero-Gun, is completely self-contained while the other model, known as milliohm meter, has its scale and control equipment separately housed from the exploring probes. Vol. 85, p. 944.

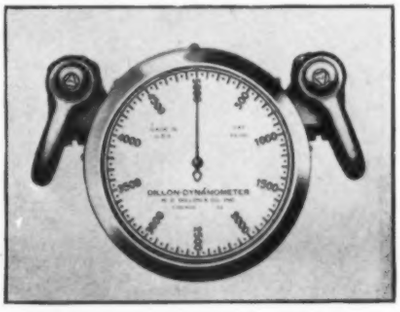


OFFSET MARKERS—*Brown & Sharpe Mfg. Co., Providence, R. I.* Two precision offset markers, designed No. 585C and No. 585D, are available in two sizes: 3 in., for use with 10-in. height gages, and 4 in., for use with 18-in. and 24-in. height gages. Vol. 85, p. 684.

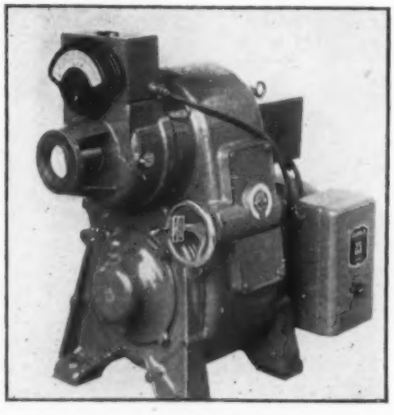
ILLUMINATED MAGNIFIER — *Eastern Machine Screw Corp., 20 Barclay St., New Haven, Conn.* Parts of all shapes up to 3-in. diameter can be inspected quickly with the "Spectifier" illuminated magnifying unit. Vol. 85, p. 132.

PRECISION GAGE BLOCKS—*Jansson Gage Co., Farmington, Mich.* A set of 81 gage blocks, with which combinations may be built up to 12.000 in. in steps of 0.0001 in., is available in three grades of accuracy—0.000008 in. per in., 0.000004 in. per in., and 0.000002 in. per in. Vol. 85, p. 33.

"ABRASER" — *Taber Instrument Co., North Tonawanda, N. Y.* Finishes such as paints, lacquers, plating and plastic surfaces can be tested with the Research Model "Abraser" machine for accurate evaluation of resistance of surface finishes to abrasion. Vol. 85, p. 270.

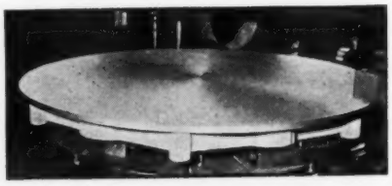


TENSION DYNAMOMETER — *W. C. Dillon & Co., 5410 W. Harrison St., Chicago, Ill.* Seven models, capable of handling loads up to 15,000 lb., are available in the tension dynamometer for use wherever it is important to know the stress on wire, flat metals, rods, castings, belts, chains, cables and other machine elements and also in a tensile strength testing machine for making sustained or breakdown tests on materials. Vol. 85, p. 522.



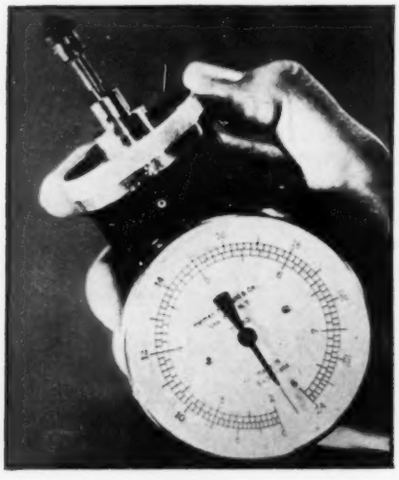
VARIABLE-SPEED TEST STAND—*Sterling Electric Motors, Inc., Telegraph Rd. & Atlantic Blvd., Los Angeles, Calif.* Standard units of "Speed-Trol" multipurpose variable speed stand are designed for continuous operation and are furnished with 5-hp. motors providing infinite speeds from 1,000 to 5,000 r.p.m., obtained by a simple handwheel adjustment. Vol. 85, p. 86.

STEEL TAPES—*Lufkin Rule Co., Saginaw, Mich.* "Chrome Clad" steel measuring tapes are chrome plated, with jet black markings and satin chrome-white surface, free of glare. Vol. 85, p. 205.

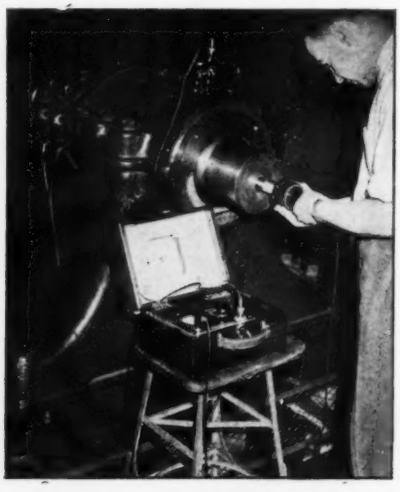


CIRCULAR SURFACE PLATE—*Fulton Foundry & Machine Co., E. 75th St. and Morgan Ave., Cleveland, Ohio.* There are six outside and one center support for the 6,700-lb. circular surface plate, 96-in. in diameter, for use in the cast condition. Vol. 85, p. 1176.

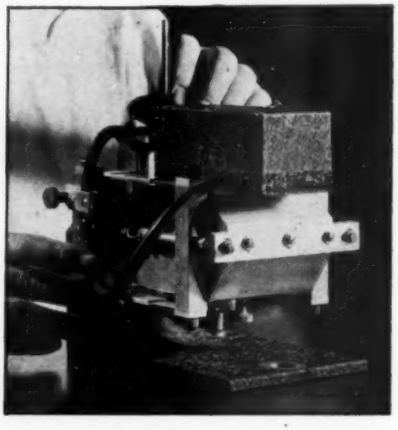
CENTRIFUGAL TACHOMETERS — *Coats Machine Tool Co., 75 West St., New York, N. Y.* Five speed ranges, selected by a rotating-type gear shift, are available with these centrifugal hand tachometers. Made in three models for ranges of 30-12,000, 45-18,000 and 60-42,000 r.p.m. Vol. 85, p. 464.



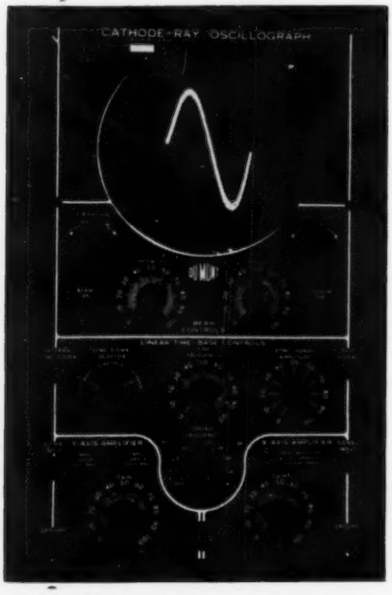
HAND TACHOMETER—*Herman H. Sticht Co., 27 Park Place, New York, N. Y.* Speeds from 30 to 48,000 r.p.m. can be accurately determined with the "Standco" universal hand tachometer. Vol. 85, p. 272.



PORTABLE BALANCING UNIT — *General Electric Co., Schenectady, N. Y.* By permitting accurate balancing under operating conditions in the rotor's own bearings, the portable dynamic balancing unit eliminates the need for shipment of heavy rotors to a balancing machine, thereby making correction of unbalance simpler, faster, more complete and less expensive than methods formerly used. Vol. 85, p. 830.

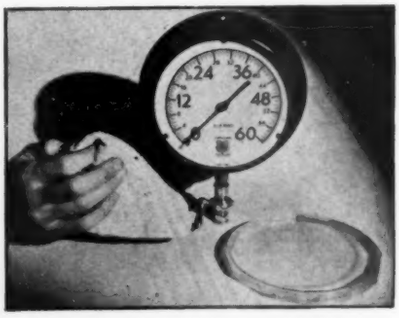


PORTABLE BALANCING PICK-UP—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Machines rotating at speeds as low as 100 r.p.m. can be dynamically balanced on their own pedestals by means of this pick-up. Vol. 85, p. 1294.

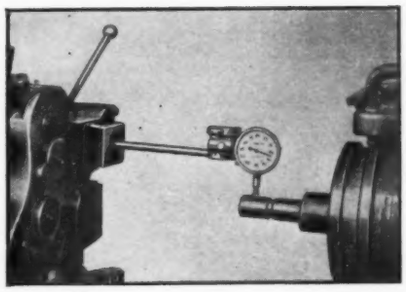


BLACKOUT PANEL—*Allen B. DuMont Laboratories, Inc., 2 Main Ave., Passaic, N. J.* The Type 208 oscillograph is equipped with a blackout panel which is treated with a non-radio active luminous paint. It can be easily observed for at least an hour in total blackness. Vol. 85, p. 1166.

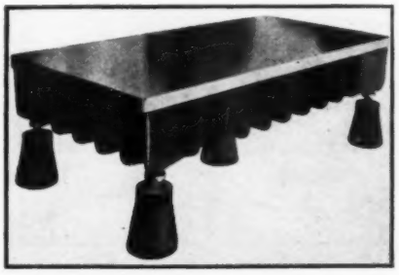
MAGNIFIER—*Mizzy, Inc., 105 E. 16th St., New York, N. Y.* The "Magni-Master" is available in hand units, stand units, or fitted for attachment to special equipment. The diameter of its finely-corrected achromatic lens is 35-mm.; its power is 4½X. Vol. 85, p. 133.



PLASTIC GAGE DIAL — *Ashcroft Gauge Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.* The plastic "Duradial" gage dial can be easily washed, and will not warp, corrode, rust, crack or otherwise deteriorate. This dial is to be used on all Ashcroft "Navy" gages, "Quality" gages, and "Duragauges". Vol. 85, p. 522.

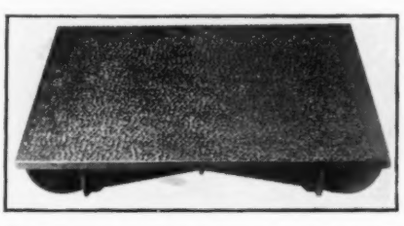


MAGNETIC INDICATOR BASE — *Mellaphone Corp., Rochester, N. Y.* This convenient stand for use with any type of dial gage indicator, employs a powerful "Alnico" magnet base to hold it to any iron or steel surface. It is equipped with a ¾-in. diameter non-magnetic post. May be used in any position without slipping or falling off. Vol. 85, p. 88.



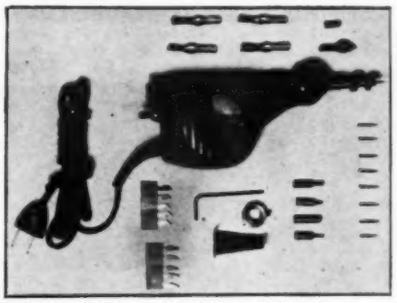
SURFACE PLATE—*South Bend Tool & Die Co., 2100 S. Main St., South Bend, Ind.* Finished plane within 0.005 in., a 48 × 96 in. surface plate has 10 or 12 in. adjustable block legs that provide working-surface heights between 29 and 33 in. Vol. 85, p. 998.

A.C. TACHOMETER — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* The a.c. tachometer has been developed to eliminate undesirable features of the conventional d.c. tachometer. Vol. 85, p. 520.

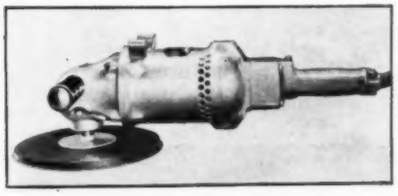


SURFACE PLATES—*Machine Products Corp., Detroit, Mich.* Surface plates with special ribbing to resist deflection and retain accuracy under load are available in sizes ranging from 10 × 15 in. to 48 × 96 in. Vol. 85, p. 1072.

ELECTRIC SANDER—*Detroit Surfacing Machine Co., 7433 W. Davison St., Detroit, Mich.* The Model XL reciprocating electric sander, for sanding, rubbing and polishing metal, plastic, wood, leather or composition material, has an interchangeable front handle that can be shifted from front to side position for work in close corners, at right angles and directly against vertical surfaces. Vol. 85, p. 1352.

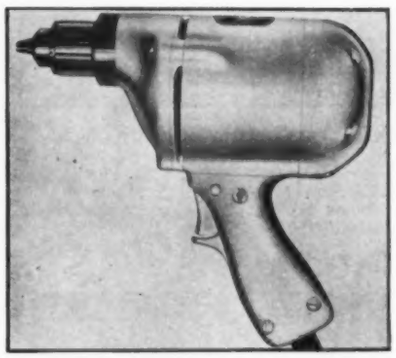


VIBRO-TOOL—*Burgess Battery Co., 180 N. Wabash Ave., Chicago, Ill.* Operating on a vibrating principle at the rate of 7,200 strokes per minute, the Vibro-Tool can be used for engraving, cutting, hammering and carving on metals and other materials. Vol. 85, p. 1002.



SANDER—*Black & Decker Mfg. Co., Towson, Md.* Quicker change of pads and abrasive disks is made possible by a fast spindle lock on the 9-in. heavy-duty production sander. Universal motor provides no-load spindle speed of 5,000 r.p.m. Vol. 85, p. 779.

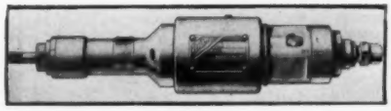
X-RAY FILMS—*Eastman Kodak Co., Rochester, N. Y.* Kodak industrial x-ray film, Code 5134, is designated for examination of moderately thick parts where minimum exposure times are essential. Suggested for use with lead foil screens, film, Code 5135, is coated with a highly sensitive emulsion. A fine grain film, Code 5141, is suitable for examination of aluminum alloy castings and other work where it is essential that fine details be recorded. Not shown. Vol. 85, p. 1021.



"AIRCRAFT" DRILL—*Black & Decker Mfg. Co., Towson, Md.* Particularly adaptable to aircraft work, this ¼-in. ball-bearing portable drill combines high power, compactness and light weight. Drilling capacity in steel is ¼ in. Standard speed is 2,000 r.p.m., but models with speeds of 3,500 and 5,000 r.p.m. are available. Vol. 85, p. 320.

PNEUMATIC SANDER—*Sterling Tool Products Co., 363 E. Ohio St., Chicago, Ill.* Only 6½ cu.ft. of air per minute at 60 lb. pressure is required to operate this lightweight portable pneumatic sander. Its flexible sanding pad permits the sanding of curved as well as flat surfaces. Vol. 85, p. 205.

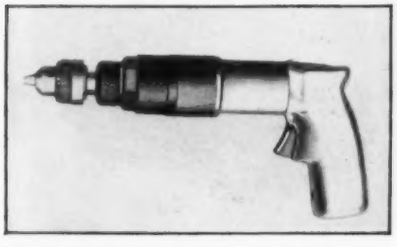
ELECTRIC SANDER—*Sterling Tool Products Co., 363 E. Ohio St., Chicago, Ill.* The "Gyro" portable electric sander weighs but 3½ lb. It operates at 4,000 r.p.m. and only one hand is needed to guide it. It can be used for rubbing and polishing in addition to sanding. Vol. 85, p. 200.



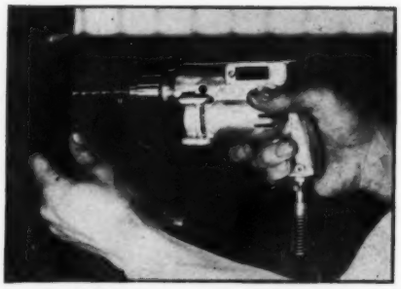
PNEUMATIC DIE GRINDER—*Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.* The "Thor" OOH rotary pneumatic grinder is powered for heavy-duty work. Spindle support is extended. Vol. 85, p. 946.

HIGH-SPEED GRINDER — *Dumore Co., Fourteenth & Racine Sts., Racine, Wis.* The No. 18 high-speed hand grinder develops a speed of 22,000 r.p.m. but has a temperature rise of only 16 C. Weight is only 4½ lb. Vol. 85, p. 205.

IMPACT WRENCH — *Ingersoll-Rand Co., Phillipsburg, N. J.* Size 508 air-operated impact wrench, recommended for nuts up to ⅝ in. bolt size, is suitable for use in close places. It is easily operated with one hand. Speed is 850 r.p.m. Vol. 85, p. 1298.



AIR DRILLS—*Ingersoll-Rand Co., Phillipsburg, N. J.* Sizes 00 and 0 "Multi-Vane" drills are designed for light weight, from 1½ to 2⅞ lb. Attachments adapt these drills for light screwdriving, nut running, close-quarter drilling, wire brushing and sanding. Vol. 85, p. 89.

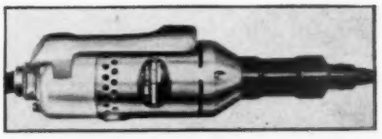


PISTOL-GRIP DRILL—*Mall Tool Co., 7740 S. Chicago Ave., Chicago, Ill.* Recommended for applications where high-speed production drills are required, this pistol-grip drill weighs 4 lb. with cord. Capacity in steel is ¼ in. No-load speed is 2,200 r.p.m. and full load speed 1,800 r.p.m. Vol. 85, p. 836.

ELECTRIC POLISHERS — *Stanley Electric Tool Div., Stanley Works, New Britain, Conn.* The No. 182 polisher can be used as a polisher, or a drill chuck can be attached to make a ½-in. drill. No. 187 polisher has a straight handle and is used for polishing only. Both are equipped with universal motors. Vol. 85, p. 368.

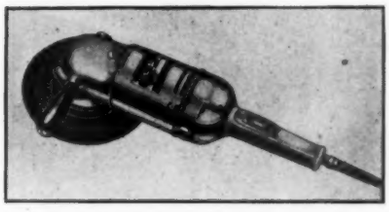
AIR GRINDER — *Ingersoll-Rand Co., Phillipsburg, N. J.* The "baby" air grinder, called the Size 00, weighs 1¼ lb. and operates at 20,000 r.p.m. at 90 lb. pressure. It is built to take 1½ in. diameter organic bonded or 1¼ in. diameter vitrified grinding wheels. Vol. 85, p. 38.

"MULTI-PURPOSE" TOOL STAND—*H & H Research Co., 12540 12th St., Detroit, Mich.* A stand into which the Senior Model Multi-Purpose Tool (described *A.M.* Vol. 84, p. 520) can be clamped eliminates necessity for clamping each workpiece; the work, instead of the tool, is held in the hand. Vol. 85, p. 632.

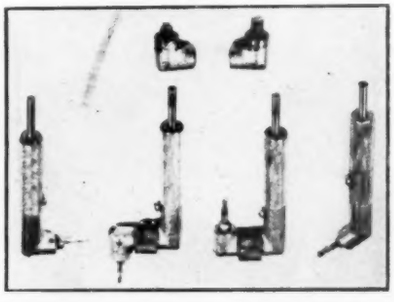


SCREW GUN—*Van Dorn Electric Tool Co., Towson, Md.* The No. 8 center-drive "Scrugun," developed especially for operation in a suspended position, drives wood screws up to No. 10 × 2 in., self-tapping screws up to No. 12, and machine screws and nuts up to ¼ in. diameter. Standard no-load speed is 750 r.p.m.; optional speeds available at no extra charge are 500, 1,000 and 1,250 r.p.m. Vol. 85, p. 458.

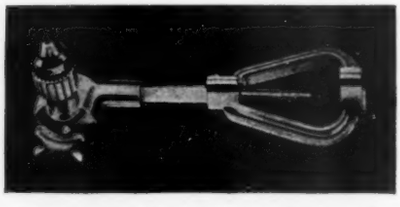
"AIRCRAFT" DRILLS — *Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.* A series of light-weight Thor ¼ in. aircraft drills for operation in limited space is available with speeds of 2,500, 3,750 or 5,000 r.p.m. Not shown. Vol. 85, p. 1020.



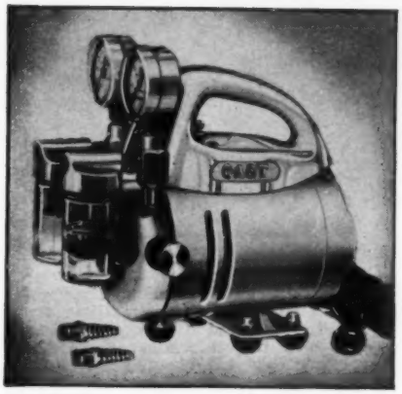
HEAVY-DUTY SANDERS — *Stanley Electric Tool Div., Stanley Works, New Britain, Conn.* Sander No. 72 takes a 7-in. diameter disk and has a speed of 4,200 r.p.m. No. 92 takes a 9-in. disk at 3,300 r.p.m. Vol. 85, p. 268.



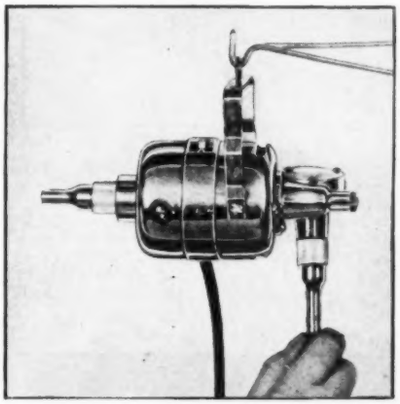
PORTABLE DRILL ATTACHMENTS—*Invincible Tool Co., 914 Citizens Trust Bldg., Fort Wayne, Ind.* Angular tool attachments, Nos. 1875, 250 and 3125, for portable drills have been developed to solve the problems of operation in small spaces and corners. Vol. 85, p. 1117.



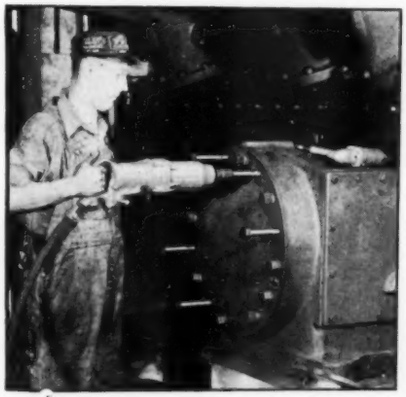
DRILL HEAD—*Kett Appliance Co., Union Central Bldg., Cincinnati, Ohio.* Axis of drill can be rotated a full 360 deg. in the Model KU-2 universal drill head for drilling either wood or steel. Head carries a ½-in. Jacob chuck. Used with a ½-in. heavy-duty electric drill, it will bore holes in wood up to 2 in. in diameter. Vol. 85, p. 190.



VACUUM-PRESSURE UNIT — *Gast Mfg. Corp., Hinkley St., Benton Harbor, Mich.* Powered by a $\frac{1}{12}$ hp. motor, this light-weight, vacuum-pressure pump is intended for use as a machine accessory. A slight adjustment converts pump from vacuum to pressure service. Vol. 85, p. 514.

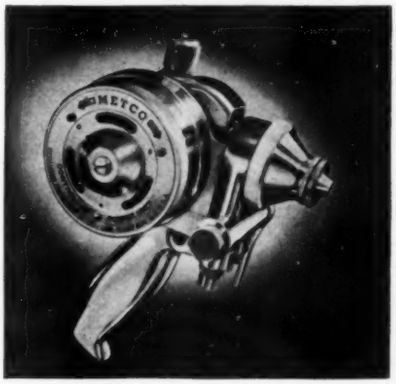


FLEXIBLE SHAFT TOOL—*Foredom Electric Co., 27 Park Pl., New York, N. Y.* Flexible shaft and hand-piece assembly of the Series 400 tools can be quickly attached to either the geared end for low speeds or direct to the motor shaft for high speeds. Vol. 85, p. 676.

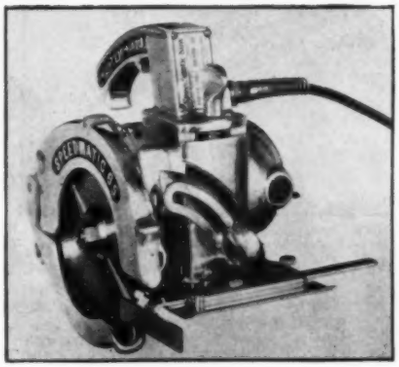


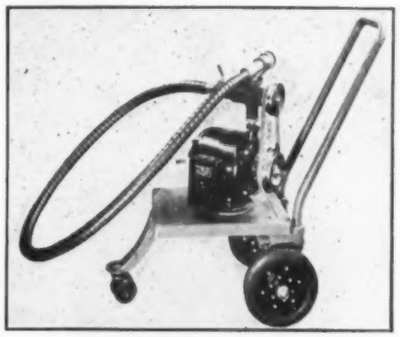
IMPACT WRENCHES—*Ingersoll-Rand Co., Phillipsburg, N. J.* The No. 534 air-operated impact wrench, for removing nuts up to 1¼-in. bolt size, has a small nose diameter, short over-all length, weighs 27¼ lb. and has an average speed at 90 lb. per sq.in. pressure of 635 r.p.m. The No. 504 impact wrench weighs 4 lb., is reversible and can handle up to and including ⅜-in. (bolt size) nuts and has an average working speed at 90 lb. per sq. in. of 1,050 r.p.m. Vol. 85, p. 829.

HYDRAULIC RIVETER—*Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill.* Ability to change with ease from one riveting position to another is the main feature of the portable hydraulic riveter available with standard C-frame yokes with 4-in. reach, 6-in. gap; 6-in. reach, 6-in. gap; 8-in. reach, 8-in. gap; 10-in. reach, 8-in. gap; and 12-in. reach, 8-in. gap. Vol. 85, p. 829.



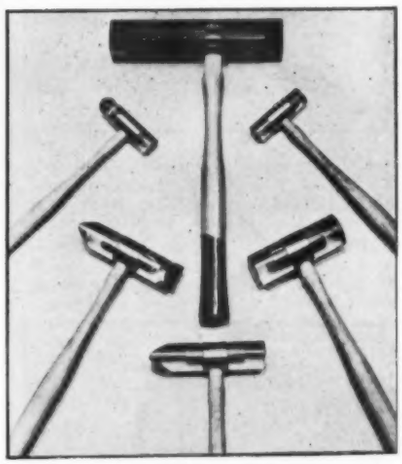
METALLIZING GUN—*Metallizing Engineering Co., 21-07 41st Ave., Long Island City, N. Y.* Acetylene, propane, hydrogen, natural or manufactured gas can be used in the improved Type 2E "Metco" metallizing gun. This gun also features a controlled power unit which gives uniform wire feed for production service and eliminates the need for gear changes. Vol. 85, p. 322.





FLEXIBLE SHAFT UNITS—*R. G. Haskins, 2760 W. Fournoy St., Chicago, Ill.* Heavy-duty truck-mounted flexible shaft machines have semi-pneumatic rubber tires. Unit shown is Model HS-7. Vol. 85, p. 1352.

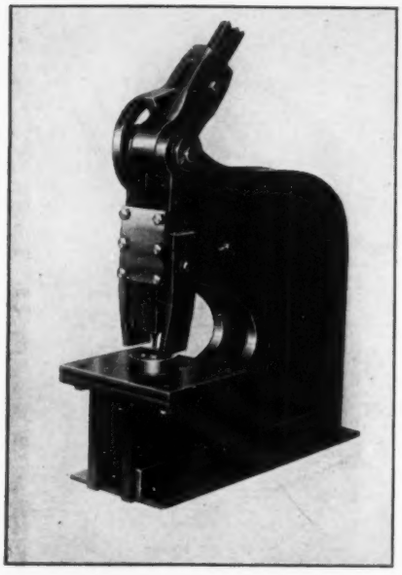
REVERSIBLE RATCHET WRENCH —*J. H. Williams & Co., 225 Lafayette St., New York, N. Y.* A Midget Pattern reversible ratchet wrench added to the Supersocket line, has a ¼-in. square drive and is 4½ in. long. Vol. 85, p. 628.



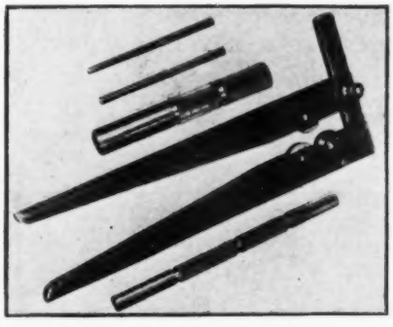
PLASTIC HAMMERS—*Rapid Mfg. Co., Glendale, Calif.* This line of plastic hammers for tools and machine shop use are available in all standard peens, ranging in weight from 3 to 18 oz. With these hammers, any metal or plated surface can be struck a full blow without being marred. Vol. 85, p. 1298.

←

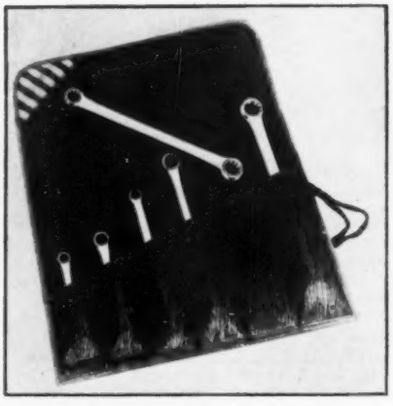
PORTABLE ELECTRIC SAW—*Porter-Cable Machine Co., Syracuse, N. Y.* The Type K-65 "Speedmatic" portable electric saw carries a 6½-in. diameter blade which travels at 7,200 r.p.m. and has a cutting capacity of 2-in. material. It weighs only 15½ lb., is powered with a ⅝-hp. universal motor and has a base which raises and lowers for depth of adjustment and tilts to 45 deg. for bevels. Vol. 85, p. 510.



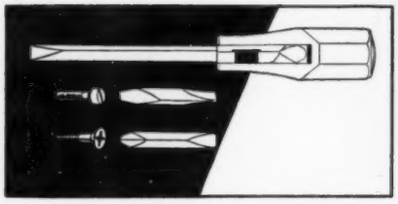
HAND PUNCH—*J. F. Kidder Mfg. Co., 426 Colchester Ave., Burlington, Vt.* No. 42 "Little Blacksmith" will cut squares, circles, notches and irregular shapes in ⅛ in. mild steel. Vol. 85, p. 31.



KNURLER—*Pacific Specialty Supply Co., 344 N. Vermont Ave., Los Angeles, Calif.* Capable of knurling ⅛ to 2 in. diameters, the "Handy" knurler operates like a pair of pliers. Vol. 85, p. 900.



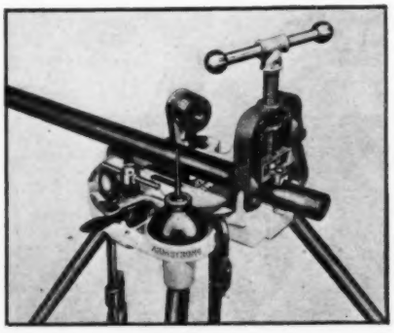
BOX WRENCHES—*Bonney Forge & Tool Works, Allentown, Pa.* Two short and four long box wrenches, with heads placed at 15 deg. angles for service where overhead clearance is low, are contained in the No. 36 set. Vol. 85, p. 944.



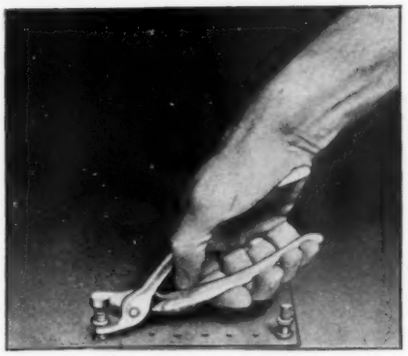
SCREW DRIVER—*Servwell Products Co., 6523 Euclid Ave., Cleveland, Ohio.* The "Fitzem" screw driver employs a square-shafted blade which is machined at one end to fit Philips screws, at the other to fit standard screws. Vol. 85, p. 632.

PIPE CUTTERS—*Ridge Tool Co., Elyria, Ohio.* With a capacity of ½ to 2 in. the No. 42 "Ridgid" pipe tool is designed especially for operation in close quarters. Vol. 85, p. 318.

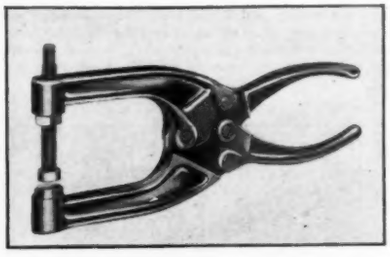
BOX PATTERN WRENCH—*J. H. Williams & Co., 225 Lafayette St., New York, N. Y.* Added to the line of chrome-molybdenum "Superrenches", a structural box pattern wrench with 12-point box head and offset handle is available in six sizes with openings from 1 7/16 to 2⅜ in. Vol. 85, p. 1354.



VISE STAND—*Armstrong Mfg. Co., Bridgeport, Conn.* The No. 933 heavy-duty "Vistand" is designed for portable or stationary use. Included in its equipment are three benders—one for ¾-in. pipe, and reverse benders for ½- and ⅜-in. pipe. Vol. 85, p. 410.

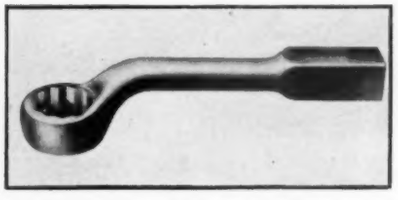


SHEET HOLDER—*Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, Ohio.* Time, effort and energy are saved in assembling aircraft and other sheet metal structures with the use of "Cleco" sheet holders. Holders are available in sizes of 3/32, ⅛, 5/32 and ¼ in. Vol. 85, p. 33.

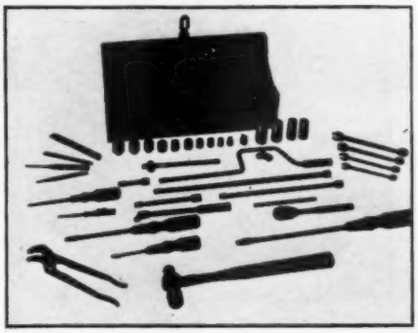


TOGGLE PLIERS—*Knu-Vise, Inc., 16841 Hamilton Ave., Detroit, Mich.* A throat capacity of 1½ × 3 in. is provided in the Model No. 450 rapid-action toggle pliers, permitting the work to be held several inches from the edge of the sheet or board. They are quickly adjustable to accommodate different thicknesses. Vol. 85, p. 87.

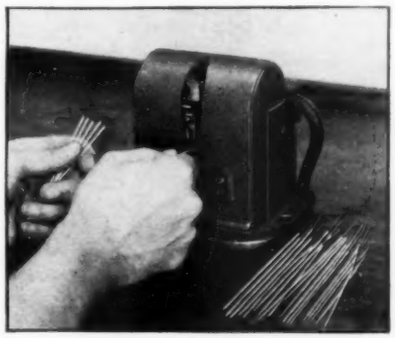
HACKSAW FRAME—*Rapid Mfg. Co., Glendale, Calif.* This heavy-duty hacksaw frame has a guard to prevent skinned knuckles from accidental contact with rough edges of sawed metal and has patented automatic tension lock. Vol. 85, p. 572.



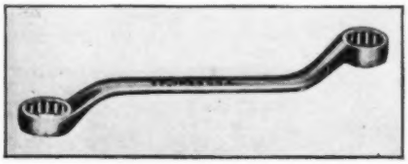
FACE BOX SUPERRENCH—*J. H. Williams & Co., 225 Lafayette St., New York, N. Y.* Available in ten sizes with 12-point openings, 1 1/16 to 3¾ in. for U. S. Standard nuts from ⅝ to 2¾ in., this box Superrench is suited for heavy work in close quarters where large nuts must be set up tight or "frozen" nuts loosened. Vol. 85, p. 780.



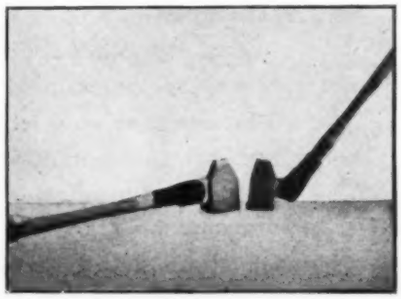
TOOL AND SOCKET SET—*Bonney Forge & Tool Works, Allentown, Pa.* Containing 40 pieces packed in a strong metal box with a removable tote tray, carrying handle, end catches and padlock hasp, sockets and attachments of the No. TD6 light-weight socket and tool set are all in ⅜-in. square drive, made of "CV" chrome-vanadium steel and chrome plated. Vol. 85, p. 786.



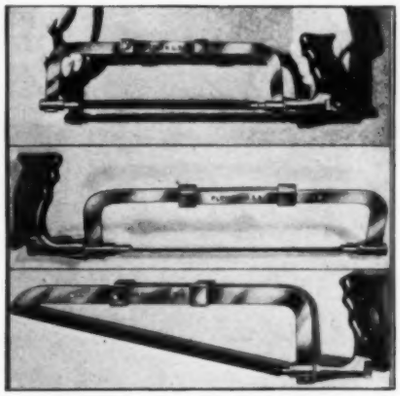
WIRE STRIPPER—*Ideal Commutator Dresser Co.*, 1057 *Park Ave., Sycamore, Ill.* Without cutting the strands, nicking, scraping or otherwise injuring the wire in any way, all types of insulations on either stranded or solid wire can be stripped quickly and easily with the "Hot Blade" wire stripper. Vol. 85, p. 89.



BOX WRENCHES—*The Plomb Tool Co., Washington and Santa Fe Aves., Los Angeles, Calif.* Four short offset box wrenches with an obstruction clearance of ⅞ in. are included in this set. Over-all length varies from 5 to 6½ in. Vol. 85, p. 1244.

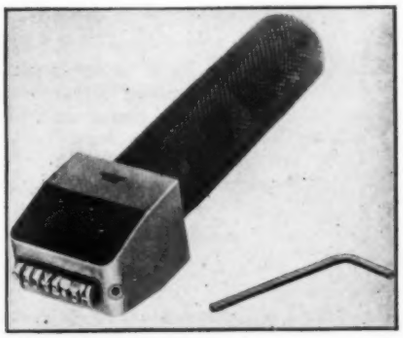


TYPE HOLDER—*Pittsburgh Stencil & Tool Co.*, 405 *Penn Ave., Pittsburgh, Pa.* This solid chrome-nickel adjustable type holder is made in all sizes to take from 1 to 10 Safeloy unbreakable steel type characters ranging from ⅛-in. to 1 in. Vol. 85, p. 832.

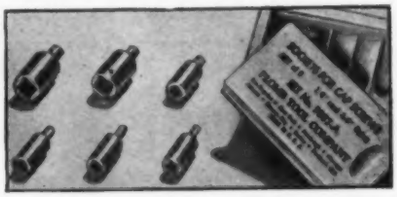


HACKSAW FRAME—*Plomb Tool Co., Washington and Santa Fe Ave., Los Angeles, Calif.* Frame of the Firmback hacksaw is designed so it can be set at an angle with the pistol grip handle. Adjustable blade mounts keep blades straight at all times, thus minimizing breakage. Vol. 85, p. 680.

MECHANIC'S TORCH—*P. Wall Mfg. Supply Co.*, 3126 *Preble Ave., North Side, Pittsburgh, Pa.* Superior mechanic's torches, Nos. 141 for gasoline and 142 for kerosene, consist of the Wall No. 41 burner, mounted on a highly polished drawn brass tank. Vol. 85, p. 676.



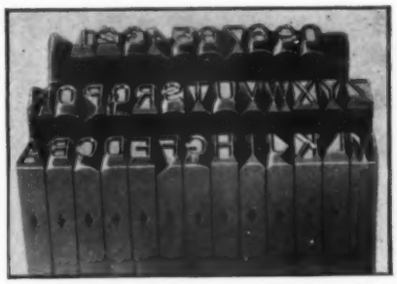
WEDGE LOCK FOR STAMP HOLDER—*New Method Steel Stamps, Inc.*, 145 *Jos. Campau, Detroit, Mich.* Special wedge lock prevents individual stamp from loosening in the interchangeable stamp holder. Wedge holds the stamp both sidewise and endwise against movement. Vol. 85, p. 1298.



SOCKETS—*Plomb Tool Co.*, 2209 *Santa Fe Ave., Los Angeles, Calif.* Socket sizes from ¼ to ⅝ in. for hexagon openings from ⅛ to ⅜ in. are available for all regular sizes of socket-head capscrews and setscrews. Vol. 85, p. 1118.

ELECTRIC ETCHER—*Ideal Commutator Dresser Co.*, 1057 *Park Ave., Sycamore, Ill.* The "Thin Line" etcher permanently marks small tools and parts with a fine-line identification number or name burned right into the metal. Vol. 85, p. 630.

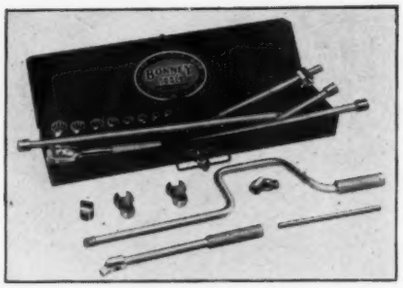
STAMPS—*New Method Steel Stamps, Inc., Detroit, Mich.* To simplify inspector identification arising from triple shift operations in defense industries, stamps are numbered from 1 to 99, but the numbers in each group are inclosed in identifying shaped borders. Vol. 85, p. 1000.



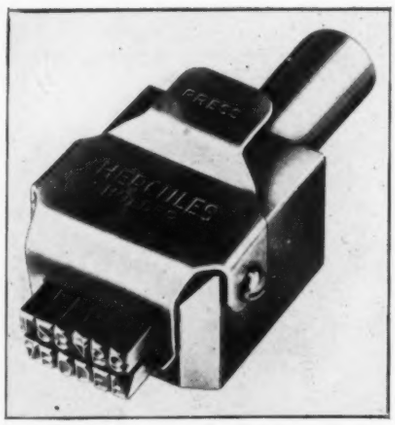
STAMPING TYPE—*The Acromark Corp.*, 245 *N. Broad St., Elizabeth, N. J.* "True center" stamping type for perfect spacing and alignment in marking steel, alloy steel and cast iron range in size from ⅛ to 1 in. Vol. 85, p. 948.

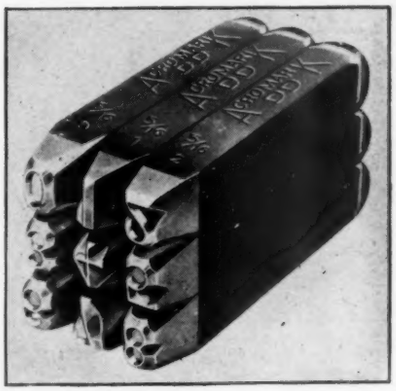
TYPE HOLDER—*Acromark Corp.*, 245 *N. Broad St., Elizabeth, N. J.* Hand style heavy-duty "Hercules" type holder will withstand continuous hammer blows sufficient to stamp steel parts and castings. Vol. 85, p. 462.

STAMP HOLDERS—*Acromark Corp.*, 245 *N. Broad St., Elizabeth, N. J.* Two-line stamp holders, for heavy duty shoulder style type which have the Hercules change, eliminate need for individual steel stamps. Shank can be fitted into punch press. Holders also are furnished in single line and curved line styles. Vol. 85, p. 1352.

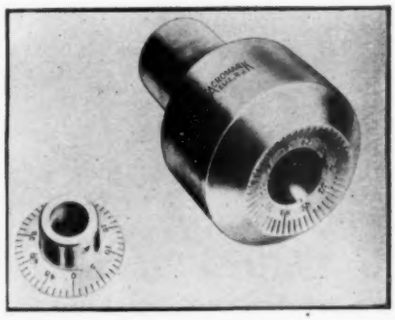


SOCKET WRENCH SET—*Bonney Forge & Tool Works, Allentown, Pa.* A socket set of 20 pieces is available packed in a metal box weighing 7½ lb. Vol. 85, p. 1244.



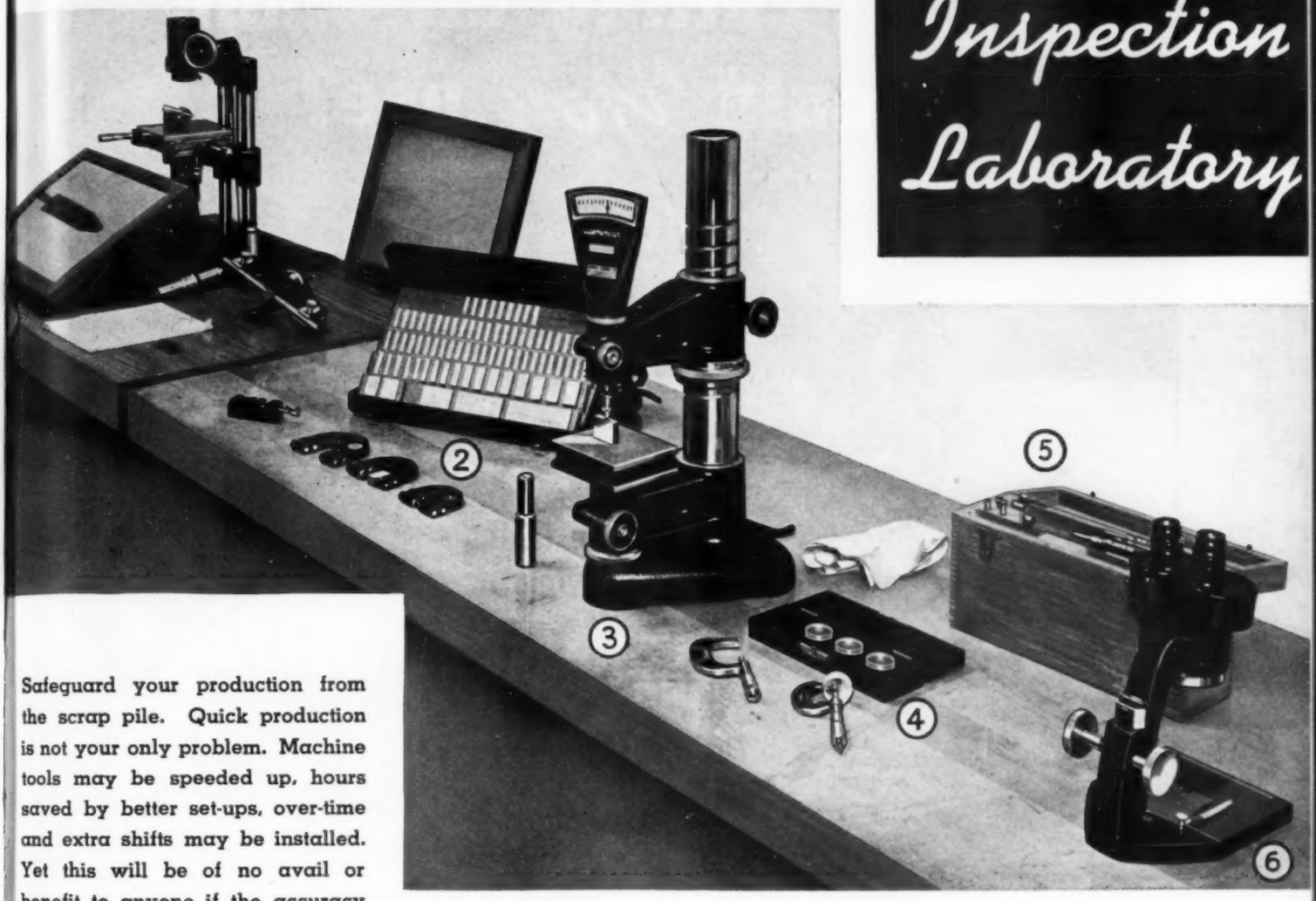


STEEL LETTERS AND FIGURES—*Acromark Corp.*, 245 *N. Broad St., Elizabeth, N. J.* Each double-duty steel letter and figure for marking stainless steel, forged parts and half hard metals is individually engraved and hand finished for accuracy. These stamps have been used to cold stamp steels formerly stamped hot. Vol. 85, p. 1352.



STAMPING DIES—*Acromark Corp.*, 245 *N. Broad St., Elizabeth, N. J.* Steel stamping dies speed production of timing rings, dials, graduated rings and other precision adjustment parts. Vol. 85, p. 948.

The SCHERR LIMITED BUDGET *Inspection Laboratory*



Safeguard your production from the scrap pile. Quick production is not your only problem. Machine tools may be speeded up, hours saved by better set-ups, over-time and extra shifts may be installed. Yet this will be of no avail or benefit to anyone if the accuracy of your product is lost with your material ending on the scrap heap. The best investment for any shop is in inspection tools to detect and eliminate the errors at the source, before they can affect production. Give your men the right tools to measure with. Remember that whether you manufacture to close tolerances of "tenths" or to wide tolerances of plus or minus .002", you must still start with the basic accuracy in tenths of thousands or else your work will not interchange with that produced in other shops. Invest in the Scherr Limited Budget Inspection Laboratory to guard against future rejections, disputes and loss of time labor and material.

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The Wilder Projector enables you to see exactly where tools, templets, gages, threads, etc. vary from specified dimensions and contours, and how much they are out. Magnifications available from 10x to 100x.

PRICE .....$267.50 F.O.B. Waltham

2. A SET OF GAGE BLOCKS

accurate within .000008" is a necessity to provide the basic standard of measurements, from which all production starts and all measuring tools and gages, used throughout the shop are checked and set. There are large and small sets of our Ultra-Chex lines to suit all requirements.

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Gives accurate dependable readings in 1/10000". Gage blocks, plug gages, tools are checked for size, tolerance and wear. Mass produced parts such as bearings, pins, bushings, are rapidly checked without dependence upon the skill or "feel" of the operator.

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Heavy-duty 0—6" size..$250.00 F.O.B. New York

4. OPTICAL PARALLELS

Required to inspect the surface of gage blocks, lapped surfaces of all kinds and parallelism of micrometer anvils. Single parallels.....$10.00
Set of 4 one-half inch thick.....$85.00
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1" and 2" in 1/10000", 3, 4, 5 and 6" in 1/1000", complete in case, PRICE.....$67.73

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With three dimensional vision reveals scratches, surface finish, imperfections, which cannot be seen with ordinary microscopes showing one plane of vision.....$153.50

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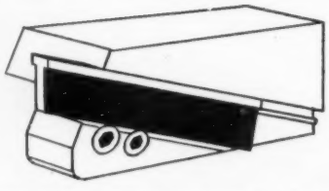
Which cutting-off blade would *You* use?

COST $2.21 PER INCH

without even taking *machine down time* into account

COST 57c PER INCH

Here is a saving of $1.64 per inch



If cutting-off operations are a part of your production routine—and if the desire for increased speed with lower costs commands much of your interest—you should learn more about the Luers Patented Blades.

These blades are setting production records in the leading plants of the country. In an aviation plant, for example, one Luers blade was used on one machine the whole day with only one sharpening every twenty-four hours and with only one inch of its length used in one week of its operation. Before Luers blades were tried in this plant one machine used four 8-inch blades every seven days. The plant runs 24 hours a day on 3 shifts. We can cite many other examples showing savings in time, money, and materials.

There is a definite advantage in letting us demonstrate the efficiency of the Luers blade in your plant—without obligation, of course.

The Explanation . . . .

FACTS REGARDING TOOL AT LEFT

Material—High speed steel			
Size—5 ft. x ½" x ¾"—7 lbs. at $1.00			$ 7.00
		Labor Hours	
Operation 1	Saw to length, 4⅞" (making 12 pcs.)	½	
Operation 2	Shape top and bottom to 11/16"	1½	
Operation 3	Mill one side to 5/32" thick	1¼	
Operation 4	Harden—12 pcs. at 25c		3.00
Operation 5	Grind top and bottom 21/32"	1¼	
Operation 6	Grind sides to ⅛"	2¼	
Operation 7	Grind end	1	
		7¾ hrs.	
7¾ hours at $3 per hour			23.25
Total cost of 12 pieces forged type cut-off blades			$33.25

With 1¼ inches of its entire length usable, the 12 blades give us 15 inches of usable blade, or an inch cost ($33.25 ÷ 15) of $2.21.

REGARDING TOOL AT RIGHT

The usable length of a Luers Patented cut-off blade is 3¼ inches. Therefore, the 12 blades will give a total of 39 inches usable blade. At a cost of $1.85 each—12 blades will cost $22.20 or an inch cost ($22.20 ÷ 39) of 57c.

So you arrive at the remarkable saving of $1.64.

Forged Type Tools	$2.21 per usable inch
Luers Patented Tools	.57
You Save	$1.64 per usable inch

Produced under license issued by John Milton Luers Patents, Inc.

The Blades that reduce friction

EMPIRE Tool Co.

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The complete line for 1942

Walker Rotary Magnetic chuck with Concentric Gap—Style D—Face Plate—Walker Rotary Chucks are made in sizes from 4" to 72" diameter with Face Plate construction adapted to the work to be held.

Walker Magnetic Chucks—in a complete range of sizes and types—can be depended on to hold work securely under the most severe conditions imposed by high production demands. They will cut time and eliminate spoiled work on grinding, planing, milling, and turning operations.

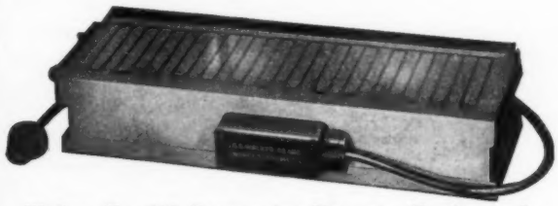
In the Walker line are included Rectangular, Swivelling, Vertical Face and Rotary type units for every requirement. The completeness and diversity of this line makes standardization practical and possible. Walker is also prepared to furnish special types promptly at reasonable price.

Many standard Walker Chucks are available from stock. Come to Walker for quick service if you are in a hurry and be assured of getting the chuck you need in shortest possible time.

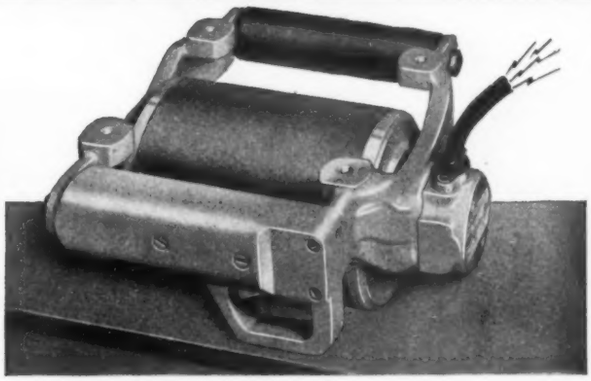
Send for the Walker Catalog No. W4 giving detailed specifications.

Walker No. 617 Bar Pole Face Rectangular Magnetic Chuck, for holding small thin work. Sizes range from 6"x10" to 12"x60".

Walker Universal Swivelling Magnetic Chuck sizes 4"x10", 4"x20" and 4"x30"—can be arranged with Vernier Reading.



Walker No. 618 Rectangular Magnetic Chuck—available in sizes from 4"x8" to 30"x96".



WALKER DEMAGNETIZERS

These units are available from Walker in standard D. C. and A.C. types for 110 or 220 V service. They provide a fast and convenient means of removing residual magnetism from a wide variety of parts. Send for Circular K7 giving detailed information.

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Worcester, Mass., U.S.A.

OUTSTANDING FEATURES OF DESIGN AND CONSTRUCTION

Arrangement of nuts insuring long bearing in spite of wear.
Decimal equivalents stamped on thimble.
F—Thimble.
Short nut—D to compensate for wear in threads.
No split in sleeve to admit dust and dirt and cause rapid wear.
Nut—C 5/8" long, twice as long as bearing in other micrometers. Can be replaced when worn.
.270" diameter screw and anvil. This gives 16½% more wearing surface at this point than .250" diam.
Nickel silver spring E. Gives uniform tension on screw.
Adjusting nut — C to overcome wear on anvil or screw. Replaceable, giving entirely new bearing for screw.
Solid inserted anvil—G.
One piece hard tool steel screw—A.
Accurately fitting bushing—H insures close fit for screw. Replaceable.
I section frame — B drop forged from bar steel.
Black enameled or polished frame.

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(MICROMETER CALIPER)

No. 22

This small sturdy instrument is highly accurate, light in weight, easy to use and convenient to handle. Weighs only 1¾ oz. Measures all sizes from 0 to ½ inch by thousandths. Available also in metric graduations.

Can be furnished with plain or friction stop.

SLOCOMB MICROMETER
Sets Nos. 22 and 28

Set #22 comprises 12 micrometers and 11 end measures. It will handle work measurements from 0-12" by thousandths. Also available for metric measurements from 0-300 m.m. by 1/100 m.m. All instruments conveniently housed in hard wood case.

Set #28 (not shown) also consists of 12 micrometers and 11 end measures for a size range from 12" to 24" by thousandths. Also available for measurements from 300-600 m.m. by 1/100 m.m.

In addition, Slocomb standard micrometer sets are made for measurements from 24" to 60" or 600 m.m. to 1500 m.m.

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Available in sizes from 0-1" to 11-12"; metric sizes available from 0-25 m.m. to 275-300 m.m.

←

SLOCOMB CENTER DRILLS

These tools are available in either carbon or high speed steel in Center Drill, Combination Center Drill and Bell Type Center Drill types. Sizes: Center Drills from ⅛" to 1"; Combination and Bell Type from ⅛" to ¾".

→

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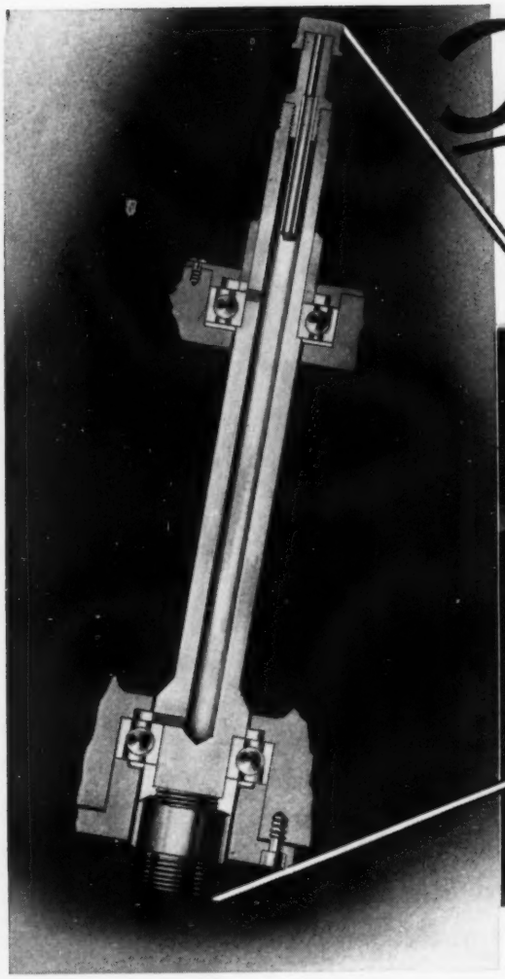
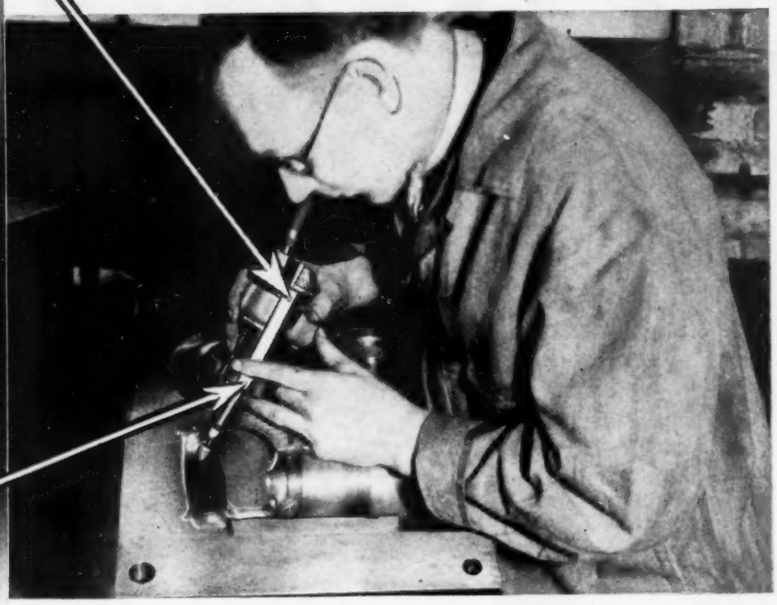
Your Copy of SLOCOMB Catalog No. 18 Is Available on Request

Write today for this 112-page catalog covering the complete SLOCOMB line of modern instruments for checking close tolerances. A useful and valuable help for machinists, shop men and inspectors responsible for checking tolerances. Send today for your copy. FREE on request.



This is why

ONSRUD GRINDERS SET THE PACE IN *PRODUCTION*



Onsrud Air Turbine Grinders permit unequalled ease and accuracy on both light and heavy duty work. Even reworking a hardened steel die is a simple job. Tremendous power, light weight, and *vibrationless* super speeds of 38,000 RPM to 75,000 RPM let you remove metal as slowly or rapidly as you desire.

At such super speeds, spindle bearings cannot stand up unless lubrication is perfect. Too much oil is as great a danger as too little. Metered Mist achieves the miracle of perfect lubrication at high RPM . . . measures out oil particles as tiny as mist, exactly as fast as required.

For precision grinding where spindles spin at super speeds, remember Onsrud tools and Metered Mist to do the job faster, easier, and for less cost.

We'll be glad to send information on any Onsrud grinder . . . portable, lathe, or bench mounted. Just write us on your company letterhead.

LUBRICATED BY

Metered Mist

Oil within the hollow spindle is driven by centrifugal force through porous resistance plugs. Proper correlation of measurable centrifugal force, plug porosity and oil viscosity establishes perfect bearing lubrication in the form of mist-like particles. Onsrud patent Metered Mist Lubrication has proved itself at spindle speeds from 7,500 to 75,000 RPM through millions of machine hours of operation.

ONSRUD MACHINE WORKS, Inc.

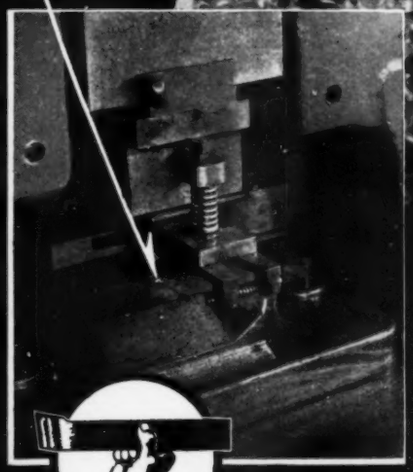
3921 Palmer Street, Chicago, Illinois, U. S. A. Sales Offices in all Principal Cities

Onsrud

AIR TURBINE and HIGH CYCLE MACHINERY and TOOLS

ROUTING • DRILLING • SHAPING • GRINDING • MILLING

Coining 42,000 contact rivets every 8 hours . . . averaging 3,500,000 pieces per die . . .



This is *performance three times better* than the steel formerly used. In coining, the crowned silver contact face of rivet is flattened .017", and a radius formed at junction of head and shank.

"TOPS IN TOOL STEELS"

Vanadium-Alloys STEEL CO. LATROBE, PA.

A FILE helps to keep it on the beam

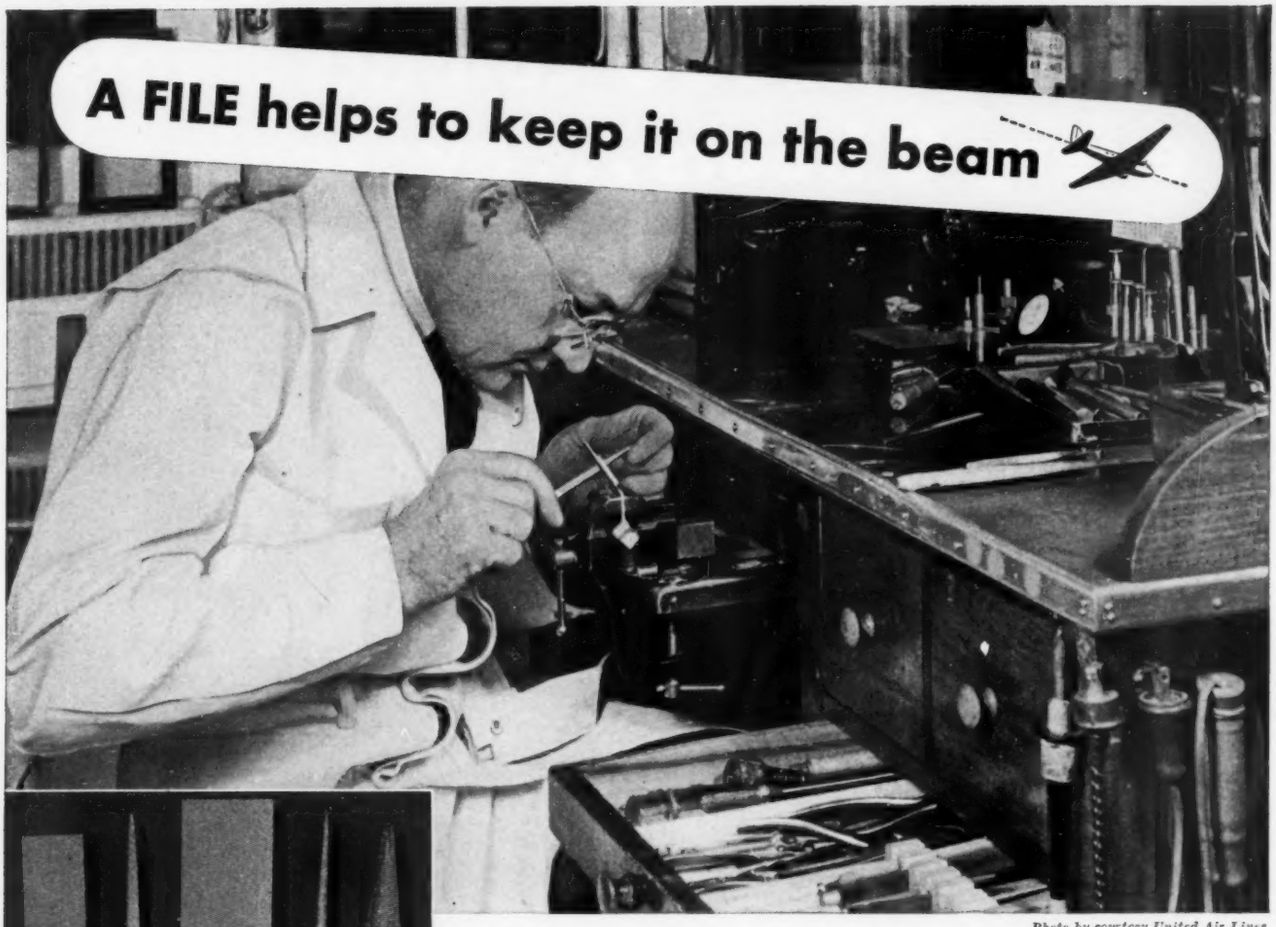
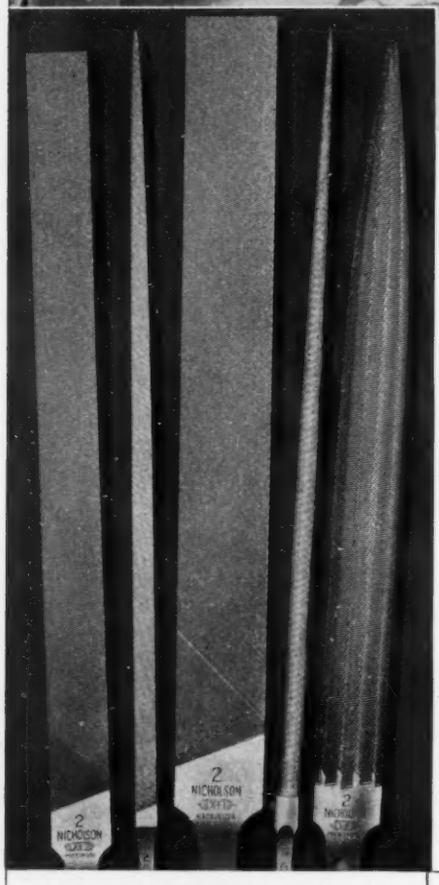


Photo by courtesy United Air Lines



• Five popular shapes (shown about 2/3 actual size) of Nicholson Die-sinker Files in Swiss Pattern. Points are smaller, tapers longer, cuts finer than in the conventional "American Pattern" files for similar purposes. Cleaning out, burring, enlarging small holes, shaping and finishing extra-narrow grooves, slots, notches and keyways are more readily accomplished.

LET'S GO! U.S.A. KEEP 'EM FLYING!

The automatic pilot of a modern transport plane is an instrument of almost uncanny performance. Keeping it in perfect tune calls for precision skill—and precision tools. Here you see an instrument expert using a Nicholson File on a delicate pilot part. It is a precision file. It is made with a keen yet silken-smooth bite that is possible only under ***exacting manufacturing standards*** and ***long experience*** . . . Nicholson heritages which enable Nicholson and Black Diamond Files to carry the extraordinary guarantee of ***Twelve perfect files in every dozen.***

Among the current heavy demands for Nicholson Files, one of the heaviest is for Nicholson X. F. (Extra Fine) Swiss Pattern Files . . . for the aircraft, automotive, die-making and fine-instrument industries particularly.

The world's largest file manufacturing plant is at peak capacity in turning out these fine files. Consult your mill-supply house.

NICHOLSON FILE CO., Providence, R. I., U. S. A.
(Also Canadian Plant, Port Hope, Ont.)

FREE TECHNICAL BULLETINS *and catalog information on X. F. Swiss Pattern, Die-cast, Aluminum, Brass, Stainless Steel, Foundry, Plastics, Shear Tooth and Long Angle Lathe Files. Write us for copies of Bulletins you want.*

NICHOLSON FILES

FOR EVERY PURPOSE

NICHOLSON U.S.A.
MADE IN U. S. A.

FOR many years in civilian production—today in defense production—and tomorrow, whatever the production needs may be . . . National Cutting Tools will continue to merit the confidence placed in them by American Industry.

NATIONAL

NATIONAL TWIST DRILL & TOOL DETROIT U.S.A.

TWIST DRILLS
REAMERS, HOBS
MILLING CUTTERS
COUNTERBORES
SPECIAL TOOLS

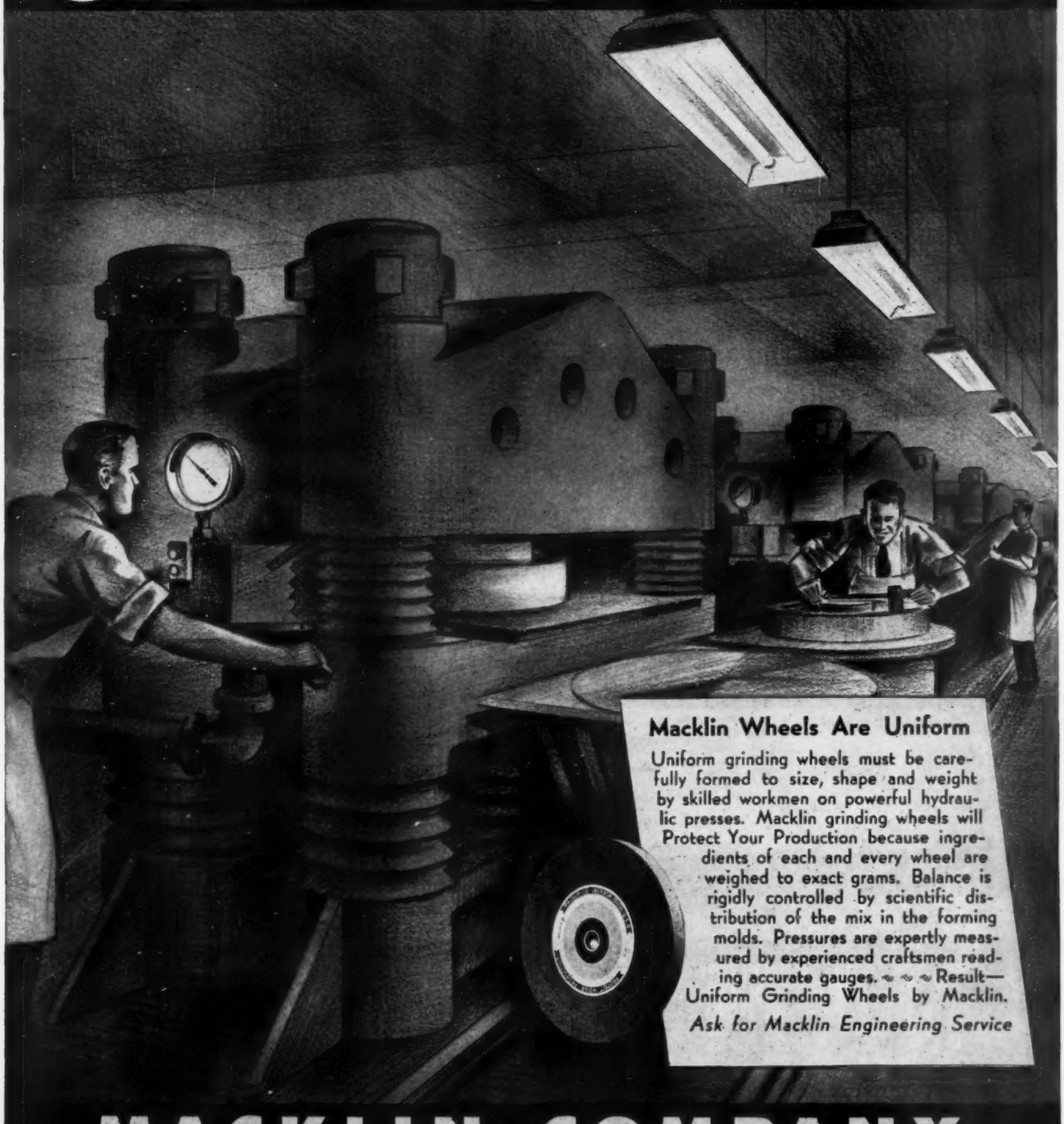
TWIST DRILL AND TOOL COMPANY

Home Office and Factory—DETROIT, MICH.

Tap and Die Division—Winter Brothers Co., Wrentham, Mass.

Factory Branches • New York • Chicago • Philadelphia • Cleveland • San Francisco • Distributors in Principal Cities

MACKLIN
GRINDING WHEELS



Macklin Wheels Are Uniform

Uniform grinding wheels must be carefully formed to size, shape and weight by skilled workmen on powerful hydraulic presses. Macklin grinding wheels will Protect Your Production because ingredients of each and every wheel are weighed to exact grams. Balance is rigidly controlled by scientific distribution of the mix in the forming molds. Pressures are expertly measured by experienced craftsmen reading accurate gauges. ∾ ∾ ∾ Result—Uniform Grinding Wheels by Macklin.

Ask for Macklin Engineering Service

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.

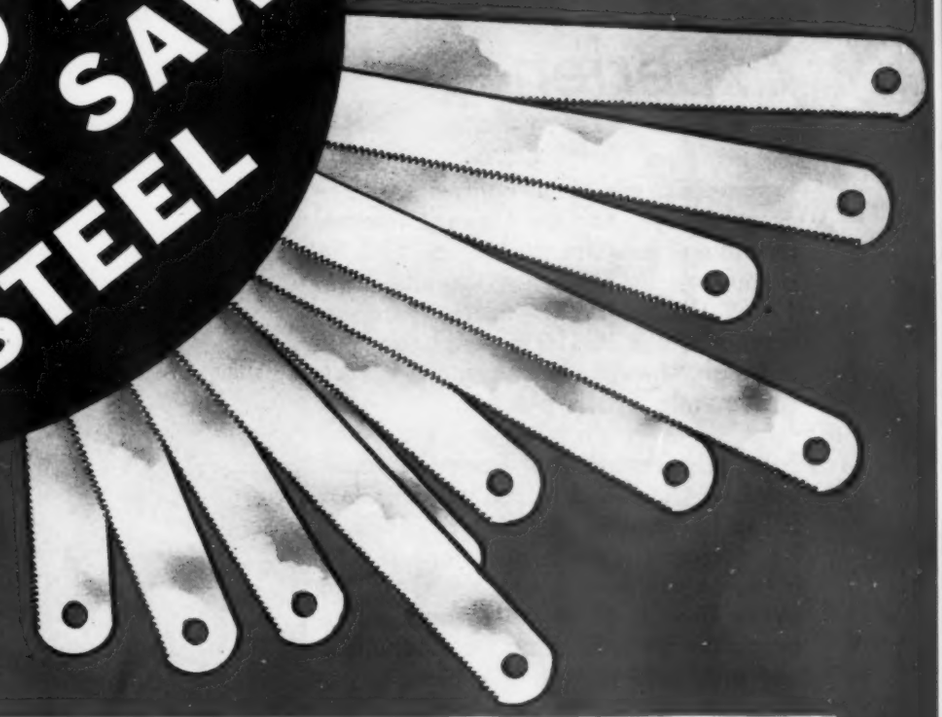
Distributors in all principal cities

Sales Offices: — Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

A New Steel *Perfected*—

Just when You Need it Most!

INGERSOLL D-B-L* HACK SAW STEEL



Produced under exclusive license arrangement with Allegheny-Ludlum Steel Corporation

Other Special INGERSOLL Sheet Steels include:

Alloy Steels
Armor Plate
Clutch Plate Steels
Tillage Steels
Soft Center Steels
Shovel Steels
Knife Steels
TEM-CROSS Steel
IngAclad (Stainless-Clad Steel)
Stainless Steels and Saw Steels, including "18-4-1" and Molybdenum and D-B-L Hack Saw Steels.

Faced with the biggest job it has ever known, American Industry welcomes the timely development of Ingersoll D-B-L.

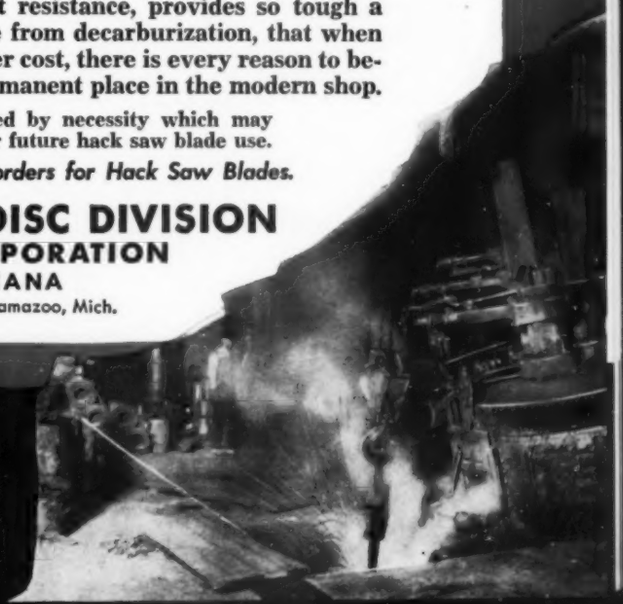
With 18-4-1 restricted by the shortage of vital alloys, the problem of supplying hack saw blades that would meet every shop need became a serious one.

Ingersoll D-B-L is so high in impact resistance, provides so tough a cutting edge, and is relatively so free from decarburization, that when these advantages are added to its lower cost, there is every reason to believe Ingersoll D-B-L has found a permanent place in the modern shop.

Here is one substitute developed by necessity which may well become the prime metal for future hack saw blade use.

Specify Ingersoll D-B-L Steel on orders for Hack Saw Blades.

INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
NEW CASTLE, INDIANA
Plants: New Castle, Ind.; Chicago, Ill.; Kalamazoo, Mich.



INGERSOLL

SPECIAL STEELS for SPECIAL USES

Profit by

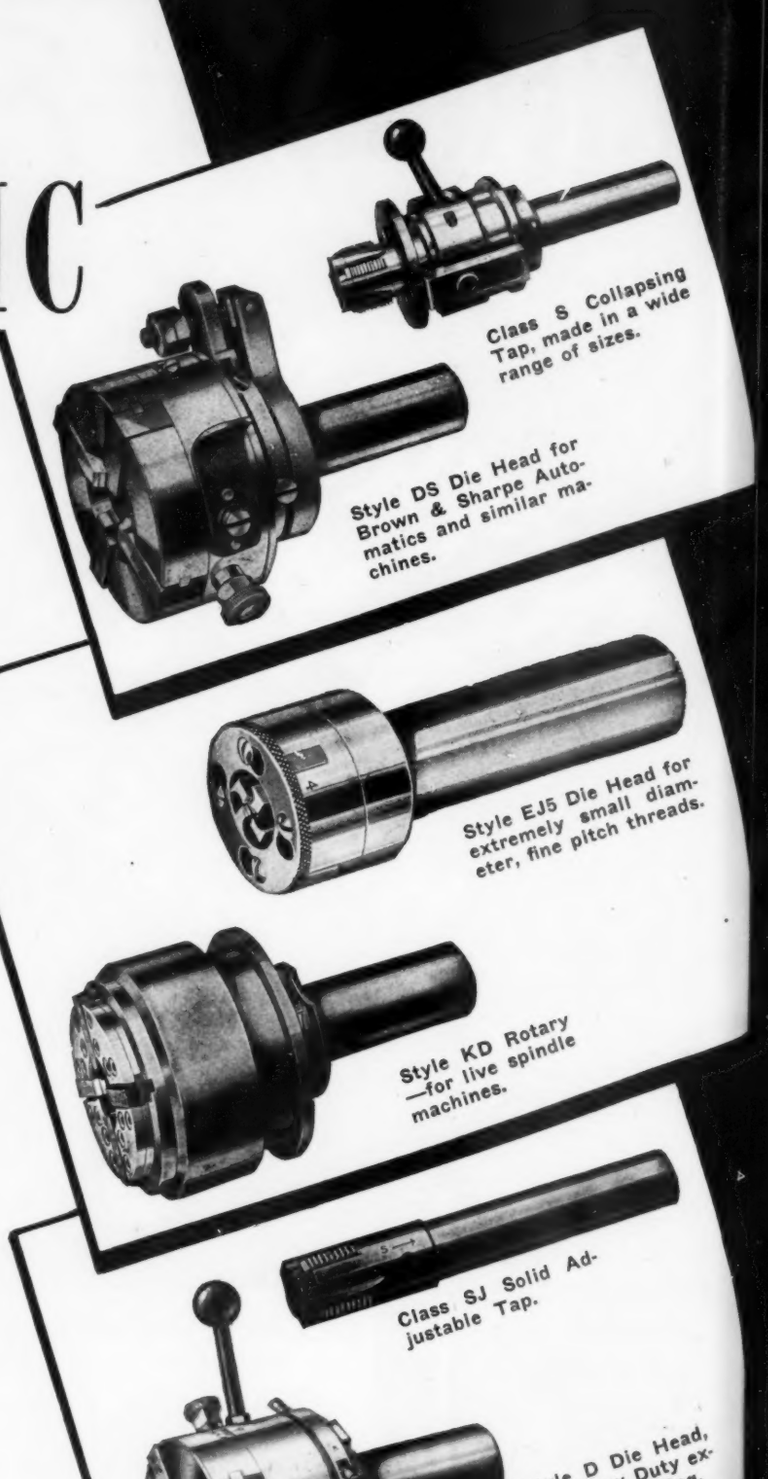
GEOMETRIC

Variety
Performance
Experience

Geometric makes a complete line—correct tools for most every internal threading job from 1″ to 10″ in diameter, for external threads from 1/16″ to 10″, for coarse threads, thread as fine as 100 per inch, threads in tough, stringy alloys, hardened steel, soft metals, brittle plastics.

Every Geometric tool from the smallest EJ-5 Die Head to the largest Class S Tap has proved its profit possibilities by performance—in munitions plants, in automotive and aircraft shops, in every branch of metal-working where precision threads must be economically produced at high speeds.

Thread production specialists for over forty years, we are familiar with every problem of thread production—the tested ways of performing standard threading jobs, the latest methods for threading the newest alloys and plastics.



Class S Collapsing Tap, made in a wide range of sizes.

Style DS Die Head for Brown & Sharpe Automatics and similar machines.

Style EJ5 Die Head for extremely small diameter, fine pitch threads.

Style KD Rotary —for live spindle machines.

Class SJ Solid Adjustable Tap.

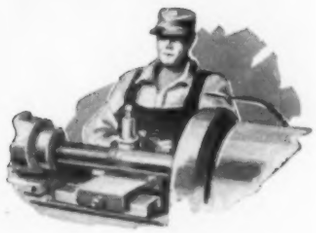
Style D Die Head, for Heavy Duty external threading.

Take advantage of Geometric experience. Tell us your threading problems and we'll suggest the correct tools and the most efficient methods for maximum thread production—and maximum profits.

THE GEOMETRIC TOOL COMPANY

NEW HAVEN CONN. U. S. A.

LATROBE



The Mark of Better Tool Steels

▲ A trade-mark should be more than a mere mark of identity . . . it should provide a tangible expression of merit!

For years this distinctive *Latrobe* symbol has served to identify the finest in tool steel quality. ▲ Today, when tooling demands are so critical, the utmost in tool steel value must be assured. ▲ You can depend upon the *Latrobe* trademark, for it has become recognized throughout Industry as *The Mark of Better Tool Steels!*

Latrobe

ELECTRIC STEEL COMPANY

MAIN OFFICES & PLANT · LATROBE · PA.

BRANCH OFFICES AND WAREHOUSES:

DETROIT
TOLEDO
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CLEVELAND

NEW YORK
CINCINNATI
MILWAUKEE
HARTFORD

ROCHESTER
INDIANAPOLIS
WASHINGTON
SEATTLE

MORE TUNGSTEN *is unnecessary*

LESS TUNGSTEN *is not enough*

MO-MAX

MOLYBDENUM-TUNGSTEN HIGH SPEED STEEL

—the original Moly high-speed steel, with less than two per cent of Tungsten, has demonstrated its superior cutting quality throughout more than nine years of widely varied service. It offers also the unique advantage of availability from fourteen independent producers listed below.

FORMULA FOR GENERAL PURPOSE MO-MAX

Carbon	.80
Molybdenum	8.50
TUNGSTEN	1.50
Chromium	4.00
Vanadium	1.00

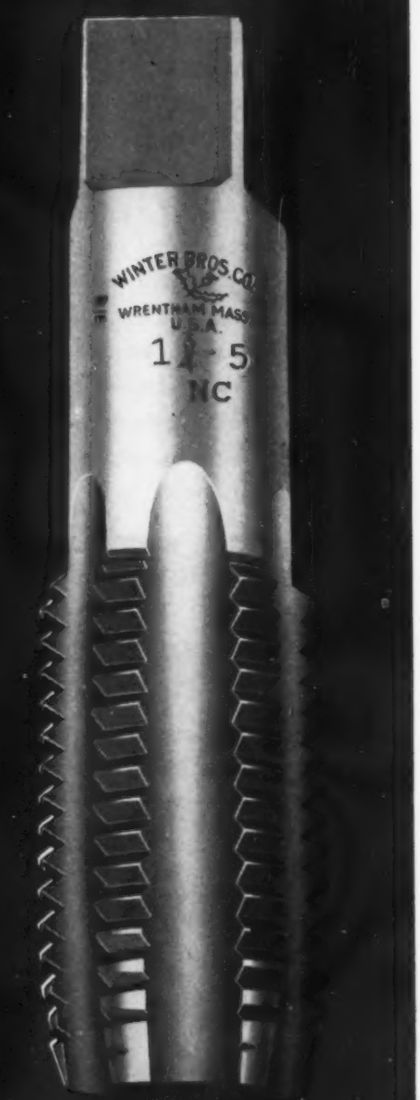
For detailed information ask your usual source of supply or write The Cleveland Twist Drill Co., Cleveland, Ohio.

"LMW"	Alleghany Ludlum Steel Co.	"Molite 8"	Columbia Tool Steel Company	"Tatmo"	Latrobe Electric Steel Co.
"Mohican"	Atlas Steels, Ltd.	"Rex-T-Mo"	Crucible Steel Co. of America	"S.T.M."	Simonds Saw and Steel Co.
"Bethlehem HM"	Bethlehem Steel Company	"Di-Mol"	Henry Disston & Sons, Inc.	"Mo-Tung"	Universal-Cyclops Steel Corp.
"Mo-Cut"	Braeburn Alloy Steel Corp.	"Rex-T-Mo"	Halcomb Steel Co.	"Vul-Mo"	Vulcan Crucible Steel Co.
"Star Max"	Carpenter Steel Co.	"Mogul"	Jessop Steel Company		

2896

Winter Taps

in a complete range of sizes to help you meet your production schedules



. . . WINTER BROTHERS COMPANY are utilizing every manufacturing facility. Men and machines are working day and night in a determined effort to meet the demands for more and more Winter Taps.

Winter Brothers products have been continually in demand because of their reputation for cutting precision threads to the most exacting specifications.

Now, when greater production is so vital, Winter Brothers are producing more of the same quality products to which their customers have always been accustomed.

USE Winter Brothers Taps in a complete range of sizes to help you meet your production schedules.

THE WINTER BROTHERS CO.

Main Factory: WRENTHAM, MASS. • *Branch Factory:* DETROIT, MICH.

A Division of the
NATIONAL TWIST DRILL & TOOL COMPANY
DETROIT

WAR MATERIEL IS NO MORE ACCURATE THAN THE GAGES THAT INSPECT IT•••

Marksmanship is the final link in making sure that the shell reaches its mark. All along the line, from specifications to the finished gun or shell, inspection of parts for accuracy makes sure that the gun will shoot as the marksman directs. Speed of inspection is of almost as great importance as accuracy. Federal Dial Indicators and Gages inspect accuracy of parts *with speed* and they *eliminate human variations*. Write for data on inspection gages for defense work to —

FEDERAL PRODUCTS CORPORATION
Providence Rhode Island

RECOIL CYLINDERS
AIRPLANE DETAILS
AIRPLANE MOTORS
CARTRIDGES
GUN BORES
GUN PARTS
PRIMERS
SHELLS
BOMBS
FUSES
ETC.
ETC.

Checks both "lands" and groove diameter of various size gun bores.

Checks diameter and depth of grooves in recoil cylinders. Below — Dial Indicator Snap Gage.

★ ★ ★ ★ ★ **FEDERAL** ★ ★ ★ ★ ★

PRECISION MEASURING INSTRUMENTS

Chicago • Cleveland • Detroit • Hartford • Los Angeles • Milwaukee • Montreal • Muncie
New York • Philadelphia • Pittsburgh • Rochester • San Francisco • St. Louis • Toledo • Toronto • Windsor

DISSTON *announces a plan to conserve defense materials and time*

American industry is pushing the accelerator to the floorboard. But full speed ahead is possible only if essential Defense *materials* are used thriftily and more production *time* is saved.

So we have developed the DISSTON CONSERVATION CONTROL PLAN . . . a Plan consisting of three special services:

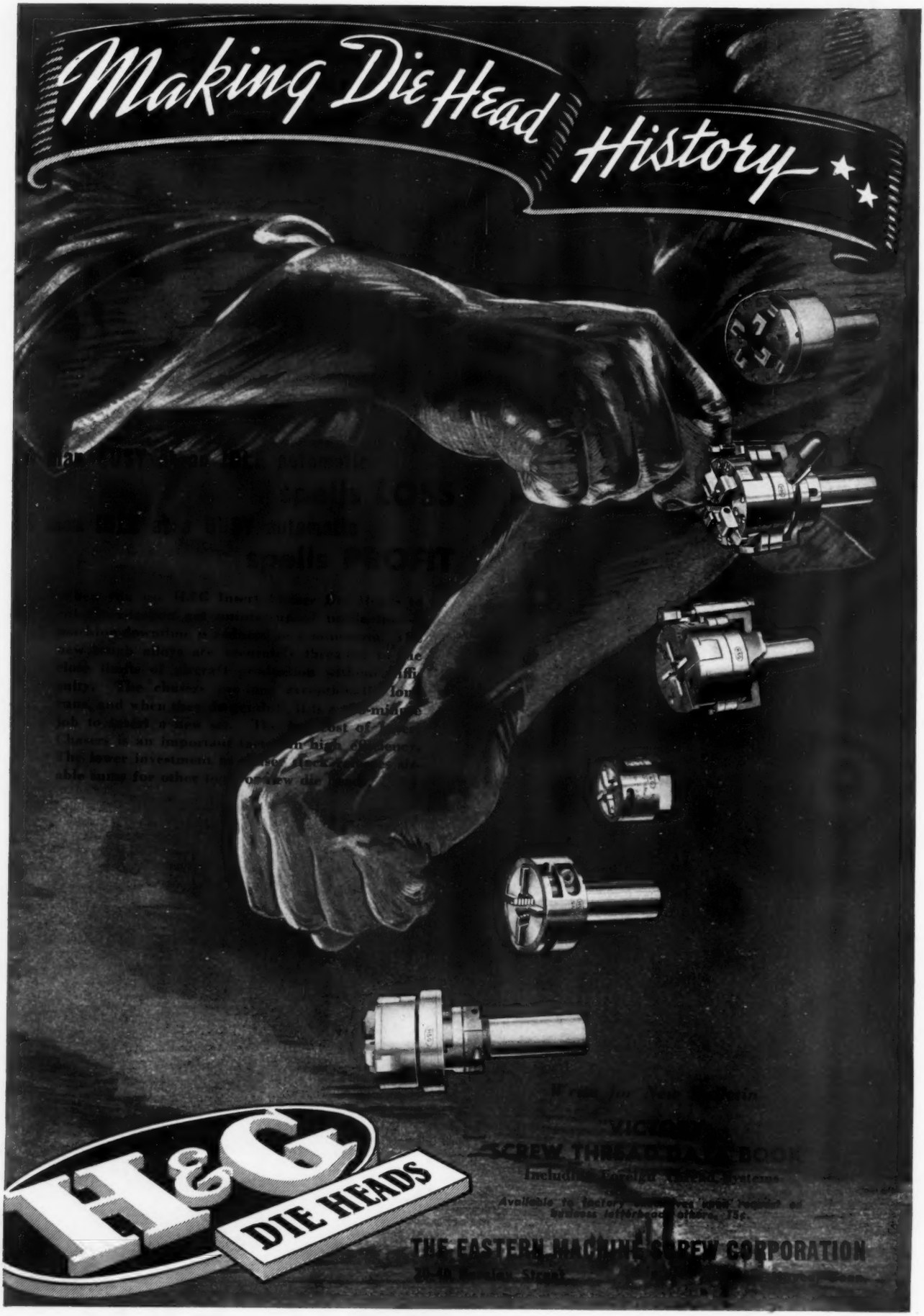
1. **Instruction cards** for each one of your employees who operates a saw, a file or hack saw or who operates any machine in which Disston products are used. Each card contains practical information on how best to use and take care of a particular tool ...shows how to make that tool work faster, last longer, and produce better results ...with fewer rejects and savings in time and materials.

2. **Bulletin board posters** for use in your plant to educate your employees in the need for taking exceptionally good care of tools and other materials and for saving vital seconds of production time.

3. **Engineering service** in the selection and application of tools in your plant. Disston engineers have the "know-how," based on years of experience in hundreds of industrial plants, to help you conserve materials and time by choosing and using tools correctly ...by fitting the tool to the specific job.

Take advantage of this Disston Conservation Program today! You'll benefit from Disston's background of 102 years' experience in manufacturing and applying quality tools. You can provide valuable free instruction for your employees...increase the efficiency of your plant. Write to Henry Disston & Sons, Inc., 120 Tacony, Philadelphia, Pa., U. S. A.

RIGHT 1942, HENRY DISSTON & SONS, INC.


Making Die Head History
H&G
DIE HEADS
THE EASTERN MACHINE SCREW CORPORATION

★ WITH POSITIVE LOCKING BLADES

LOVEJOY
MILLING CUTTERS
. . for modern metal cutting requirements

The Lovejoy line of milling cutters is designed to withstand the 24 hour schedule of a wartime production.

Speed, accuracy, and a minimum of sharpening time are absolute requirements — met by Lovejoy Cutters with their husky forged housings, accurately ground bores, and quickly changed *positive locking* blades.

Lovejoy further assures maximum production because any Lovejoy Cutter of a given type has interchangeable blades over a wide range of cutter diameters. Blades for all standard types are carried in stock for immediate delivery. These blades include High Speed Steel, Cemented-Carbide, Stellite, and Rexalloy.

Lovejoy Milling Cutters and Blades are backed by 24 years of continuous dependable service and satisfied customers.

LOVEJOY TOOL CO., INC., SPRINGFIELD, VT.

Free

MAIL THE COUPON TODAY →

Please send me my copy of your 24 page catalog No. 26 describing Lovejoy Milling Cutters in complete detail. (No obligation, of course.)

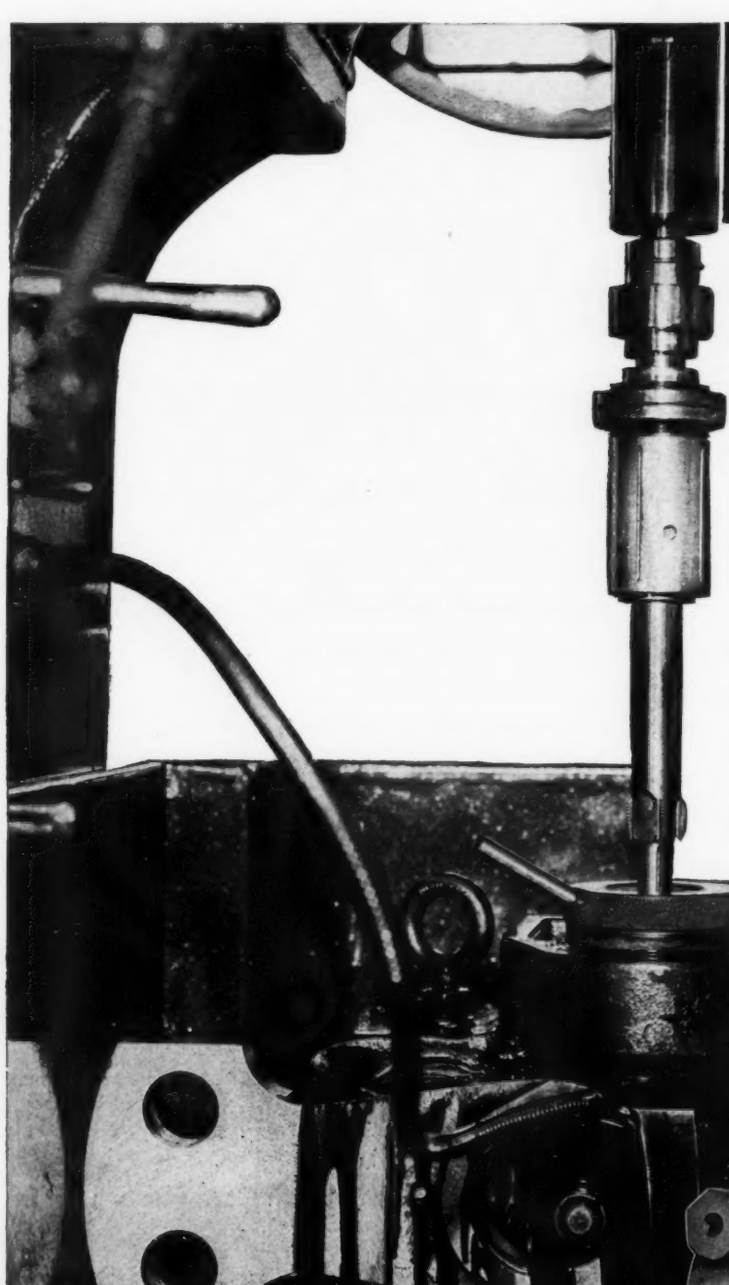
NAME_____ TITLE_____

COMPANY_____

STREET_____

CITY_____ STATE_____

A. M.



MODERN COLLAPSIBLE TAP PROVES RIGHT FOR THIS WRIGHT JOB

Rough tapping the 1½"—12 thread in chrome nickel aeroplane crankshaft ends with a hardness of 370 Brinnell has been speeded up at the Wright Aeronautical Corporation with a MODERN Collapsible Tap.

With the use of this special piloted MODERN Collapsible Tap reversing time is saved. When the thread is cut the chasers automatically collapse, allowing the tap to be withdrawn and leaving the threads clean and true with no danger of them being mutilated or marked.

Then, too, the size adjustment in these new MODERN Collapsible Taps permits the chasers to be resharpened time and time again and then adjusted to cut diameter desired.

So successful was the first application of the special MODERN Collapsible Tap on crankshaft ends that more of them have recently gone into the Wright Plant for similar tough tapping jobs on crankshafts.

Whether your jobs are specially tough ones or straight "run of mill" tapping you may find that MODERN Collapsible Taps can save you time, money or both. Ask for Bulletin M-111.

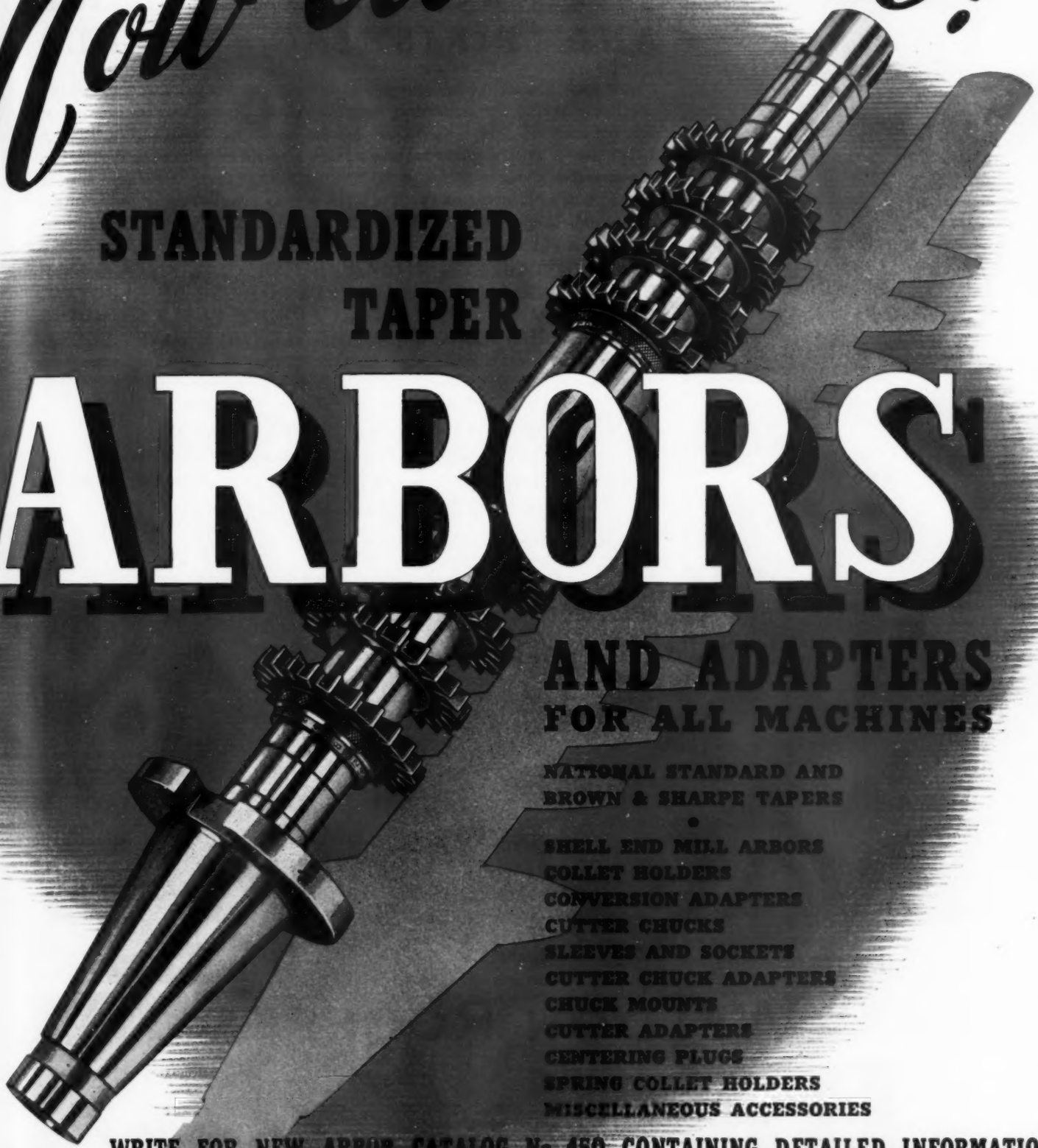
This photograph taken at Wright Aeronautical Corporation, Paterson, N. J. shows a special MODERN Collapsible Tap rough tapping 1½"—12 threads in chrome nickel crankshafts.

MODERN TOOL WORKS

DIVISION OF CONSOLIDATED MACHINE TOOL CORPORATION

ROCHESTER **NEW YORK**

Now Available!



STANDARDIZED TAPER

ARBORS

AND ADAPTERS FOR ALL MACHINES

NATIONAL STANDARD AND
BROWN & SHARPE TAPERS

•

SHELL END MILL ARBORS
COLLET HOLDERS
CONVERSION ADAPTERS
CUTTER CHUCKS
SLEEVES AND SOCKETS
CUTTER CHUCK ADAPTERS
CHUCK MOUNTS
CUTTER ADAPTERS
CENTERING PLUGS
SPRING COLLET HOLDERS
MISCELLANEOUS ACCESSORIES

WRITE FOR NEW ARBOR CATALOG No. 450 CONTAINING DETAILED INFORMATION

SCULLY-JONES AND COMPANY

1901 SO. ROCKWELL ST., CHICAGO, ILLINOIS

TIME SAVINGS UP TO 300%

IN POLISHING, PRE-POLISHING AND FINISHING METALS

TABLETS

STICKS

HALF ROUND

A unique, elastic rubber compound impregnated with abrasive, which is already saving up to 300% in finishing time in a number of important war industries. The soft rubber binder cushions the abrasive, giving Brightboy a utility quite different from a grind or a buff. In operation the abrasive recedes into the resilient rubber, falling free as the soft rubber binder is worn away. Its light action produces a smooth finish, pre-polish or polish on all kinds of metals with a minimum dimensional loss of material.

MADE IN TABLETS, STICKS AND SPECIAL SHAPES FOR HAND WORK. MADE IN WHEELS FOR USE ON ELECTRIC AND PNEUMATIC STATIONARY AND PORTABLE GRINDING AND FINISHING MACHINES AND FLEXIBLE SHAFT EQUIPMENT. No special setup necessary. Brightboy is ready for immediate use.

SPEEDS UP POLISHING and FINISHING
REMOVES HEAT MARKS AFTER WELDING
SMOOTHS and FINISHES PARTS AFTER SHAPING
REMOVES LIGHT BURRS and ROUGH EDGINGS FROM STAMPINGS
SMOOTHS UP WELDED and SOLDERED JOINTS

Sold and stocked by leading distributors. If your regular distributor cannot supply you, write us. THERE'S NOTHING LIKE BRIGHTBOY. See it, test it. You'll find hundreds of applications for it in your plant.

BRIGHTBOY INDUSTRIAL DIV. WELDON ROBERTS RUBBER CO. Newark, N. J.

WHEELS

WELDON ROBERTS Brightboy

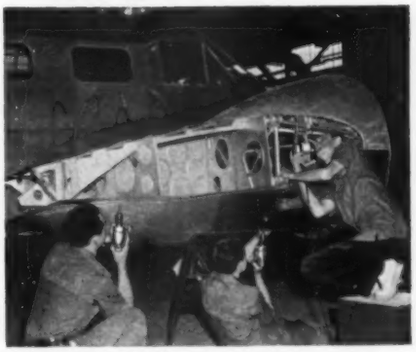
Let **BLACK & DECKER** Help You Get

More Defense Output Per Square Foot

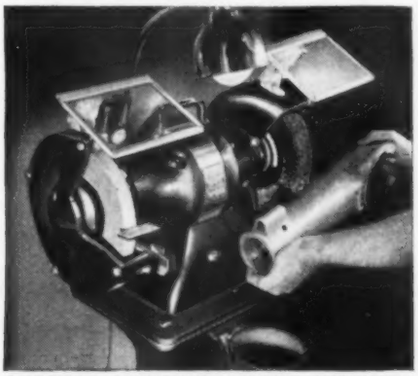
COMPACT, light-weight Black & Decker Portable Electric Tools enable you to utilize all available floor space, to attain maximum Defense production capacity. Whether your contracts cover drilling, grinding, cutting, surfacing or assembling operations, "Electric Tool Headquarters" can serve you with—

1. The engineering "know-how" to produce tools specifically designed to solve definite production problems;
2. Dependable advice on Defense tooling up, through the largest field force in the electric tool industry;
3. 120 different types of portable electric tools, a few of which are illustrated here;
4. A convenient and informed source of supply, through leading distributors in all principal cities;
5. Prompt repair and parts service, from 26 factory-owned branches located coast-to-coast.

These expanded facilities indicate how Black & Decker is "doing its bit" to help industry and the nation in this emergency. The Black & Decker Mfg. Co., 716 Pennsylvania Avenue, Towson, Maryland.



DRILLING MOTOR NACELLE with Black & Decker HOLGUNS. Built for continuous service, these light-weight Electric Drills are stepping up aircraft drilling operations in almost every aircraft plant in the country.



COMPACT, POWERFUL BENCH GRINDERS made by Black & Decker save space and time, when spotted at handy points. Sharpen tools, grind, wire-brush and polish.

SPEED DEFENSE ASSEMBLY OPERATIONS with Black & Decker Electric Screw Drivers and Nut Runners. 27 models, with features and capacities to meet every production requirement.

Photo courtesy Public Information, Canada

AIRCRAFT WORKER using Black & Decker Lectro-Shears to cut patterns from stainless metal. These Lectro-Shears cut through metal like a knife through butter.

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC TOOLS

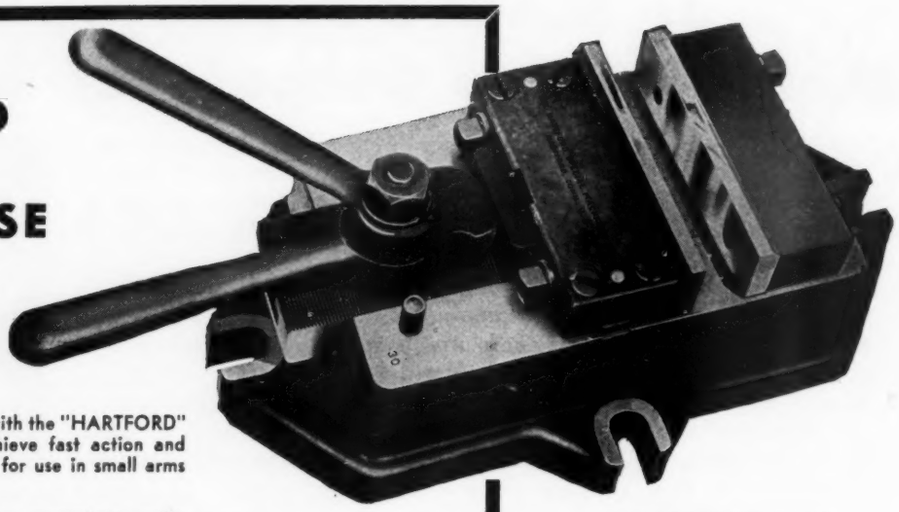
Free **HANDBOOKS**

Help You Tool-Up For Defense

Write for Black & Decker's Assembly Tool Handbook, 1942 Complete Tool Catalog, Electric Saw Handbook, or Hammer Handbook — according to your requirements.

The HARTFORD Quick Acting MILLING VISE

Holds work securely under highest speed and feeds



Speed up munitions production with the "HARTFORD" Vise—specially developed to achieve fast action and tremendous binding force—ideal for use in small arms manufacture.

All operations are handled by two convenient, easily operated levers which can be manipulated by one hand. The lower cam faced lever provides quick opening and the top eccentric lever exerts pressure for holding the work. Release of top lever and a quarter turn of lower lever opens jaws instantly for chip clearance or change of work.

Position of movable jaw on the "Hartford" and the fact that it is a single piece heat treated steel drop forging, ground on all fitting surfaces makes this vise practically indestructible and assures accurate jaw alignment in hardest service. Made in plain and swivel types. All parts interchangeable for quick and easy replacement; jaw screw holes interchangeable with No. 2 B&S Vise.

The HARTFORD SPECIAL MACHINERY CO.
HARTFORD, CONN.

SPECIFICATIONS

Available in Plain and Swivel Types

Width of Jaw—5"

Depth of jaw—1 3/16"

Max. opening (Plain Jaw)—2⅝"

Max. opening (Swivel Jaw)—2¼"

Weight—40#

Dimensions (overall) 13" long—8" wide—5" high

INVESTIGATE NOW!

WILLARD Spring TOOL HOLDERS

FINER QUALITY WORK AND FASTER CUTS—ASSURED WITHOUT CHATTER OR DANGER OF TOOL BREAKAGE . . . . . .

Willard Tool Holders have been specially developed to save time and insure precision on high production repetitive work such as that demanded in shops busily engaged in AUTOMOTIVE, AIR CRAFT and DEFENSE MANUFACTURING.

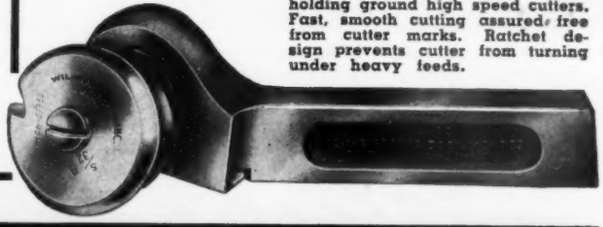
They are available for a wide number of operations and hold tools securely against chatter. Cutter breakage is eliminated and the possibility of damaged work reduced to a minimum.

PROMPT DELIVERIES

Write today for descriptive folder which gives details on Willard Tool Holders for Forming, Threading and Forming Tools, Cutting Off Tools and Threading Tools.

Cutting-off Tool Holders reduce cut off time in half over solid tools. Spring feature makes faster feeds and heavier cuts safely possible.

Forming Tool Holders—adapted to a wide range of work in lathes, shapers and screw machines. Any number of cutters can be used in the same holder.



Forming Tool Holders — with straight and right hand offset—for holding ground high speed cutters. Fast, smooth cutting assured free from cutter marks. Ratchet design prevents cutter from turning under heavy feeds.

Product of **AUTO-ORDNANCE CORPORATION**

Manufacturers of-THE THOMPSON SUBMACHINE GUN

TRADE-MARK Thompson REG. U.S. PAT. OFF.

1437 Railroad Avenue
BRIDGEPORT, CONN.

WHERE YOU CAN'T USE CEMENTED CARBIDES GET A *Big Plus* IN PRODUCTION WITH "G"

TANTUNG G

PATENTED

Vascoloy RAMET

• Where you can't use cemented carbides, this is the easiest way to get a big plus in production. Figure out for yourself what it would mean if you could increase your cutting speeds 50% —And some have doubled their speeds just by substituting Tantung "G" tools. The same tools work equally well on steel, cast iron and non-ferrous metals.

It's so easy too, to make the switch to Tantung "G". Tools are available as standard in a wide variety of sizes in solid tool bits, all purpose tools, cutting off tools, and as blades for inserted tooth milling cutters. Special tools can be made for the unusual setup.

You owe it to yourself to get full particulars at once.

VASCOLOY-RAMET CORPORATION
NORTH CHICAGO, ILLINOIS
DISTRICT OFFICES

BIRMINGHAM: *3-2905* • BUFFALO: *Washington 7716* • CHICAGO AREA: *Rogers Park 9500*
CINCINNATI: *Main 5387* • CLEVELAND: *Cherry 0278* • DETROIT AREA: *Madison 6300*
HARTFORD, *32-5197* • MILWAUKEE, *Broadway 3111* • NEW JERSEY AREA: *Journal Square 2-2231*
NEW YORK AREA: *Worth 2-3923* • PHILADELPHIA: *Trinity 8782* • PITTSBURGH: *Atlantic 9699*
PROVIDENCE: *Dexter 1271* • ST. LOUIS: *Newstead 3110* • SYRACUSE: *3-0334*
IN CANADA: Carbide Tool & Die Company, Ltd., Hamilton, Ont.

421

THE TOOLS THAT GET THINGS DONE

TUNGSTEN CARBIDE TIPPED TOOLS

Price $1.00 Each In Any Size

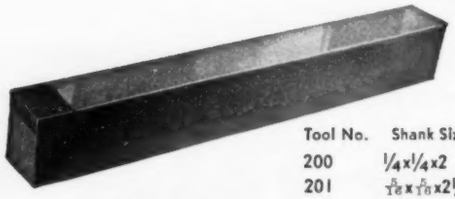
New Low Prices — Increase Production — Cut Operating Costs

Tools are tipped with Tungsten Carbide, and are suitable for machining cast-iron, brass, bronze, aluminum, non-ferrous materials such as hard rubber, bakelite, fibre, and tough alloy steels up to 500 Brinell hardness

Left Hand-Reverse Image. Right Hand Shown

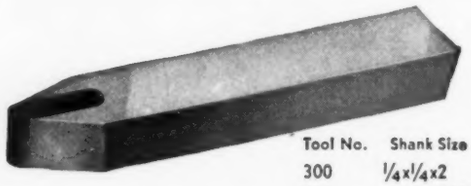
SERIES 100

Tool No. RH	LH	Shank Size
R-100	L-100	1/4 x 1/4 x 2
R-101	L-102	5/16 x 5/16 x 2 1/4
R-103	L-104	3/8 x 3/8 x 2 1/2
R-105	L-106	7/16 x 7/16 x 3
R-107	L-108	1/2 x 1/2 x 3 1/2



SERIES 200

Tool No.	Shank Size
200	1/4 x 1/4 x 2
201	5/16 x 5/16 x 2 1/4
202	3/8 x 3/8 x 2 1/2
203	7/16 x 7/16 x 3
204	1/2 x 1/2 x 3 1/2



SERIES 300

Tool No.	Shank Size
300	1/4 x 1/4 x 2
301	5/16 x 5/16 x 2 1/2
302	3/8 x 3/8 x 2 1/2
303	1/2 x 1/2 x 3 1/2

Standard Tungsten Carbide Tipped Tool Bits

In lots of 12 assorted in any Series; 100-200-300 Series an extra 10% will be allowed; also in lots of 50 assorted 20% discount will be allowed.

Sizes not listed as well as special TIPPED TOOLS will be quoted upon request. When ordering, state tool number and quantity desired.

WE CARRY SILICON CARBIDE EMERY WHEELS FOR GRINDING TUNGSTEN CARBIDE TOOL BITS

Send for our new 1941 general catalogue

VICTOR MACHINERY EXCHANGE, Inc.

251 CENTER STREET NEW YORK, N. Y.

NOW more than ever — you need the SPEED plus DEPENDABILITY of this Ettco-Emrick TAPPING AND DRILLING EQUIPMENT

Perfected through more than 20 years of specialization this equipment embodies exclusive features which assure fast operation with maximum dependability.

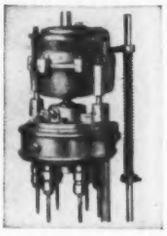
←TAPPING ATTACHMENTS

With these attachments, fast, accurate tapping can be done on any drill press. Exceptionally sensitive friction clutch permits high-speed tapping with full tap protection. Friction members replaceable as a unit in a few minutes. Sizes for No. 0 to 1" taps. **For full details write for Bulletin No. 2.**

←TAP CHUCKS with a visible grip that saves time and taps because it assures true centering on the round and positive driving on the square. Sizes for No. 0 to 1" taps. **Full details in Bulletin No. 6.**

MULTIPLE TAPPING AND DRILLING HEADS →

An exclusive system of interchangeable tapping and drilling heads made entirely of stock parts arranged and assembled to fit specific requirements. Can be supplied with Quill Clamps for attaching to any drill press. The quick, low-cost way to tool up for multiple tapping and drilling. **For full details write for Bulletin No. 3.**



←HIGH-SPEED TAPPING MACHINE

2400 accurately tapped holes per hour is normal production on this foot-operated machine with the standard 2-spindle head, while with Ettco-Emrick Multiple Heads described above, production can be increased up to 12,000 holes per hour. Unskilled labor can do it because Ettco-Emrick design **eliminates the human element from the actual tapping operation. For full details write for Bulletin No. 4.**

KEYLESS DRILL CHUCKS →

These chucks have been Industry's favorites for over 20 years because they eliminate the bothersome key, and because of their rugged, long-wearing construction. They save time and energy and give years of hard, continuous service. They are also available for all makes of portable electric drills. **Full details in Bulletin No. 6.**

AT YOUR SERVICE—The benefit of our long specialized experienced with all kinds of tapping and drilling problems. Our recommendations are yours without obligation.

ETTCO TOOL CO.

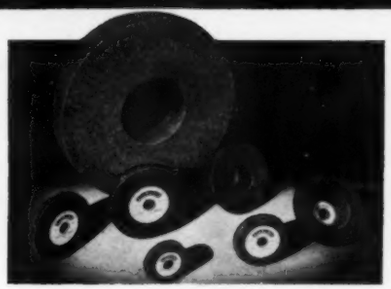
590 Johnson Ave., Brooklyn, N. Y.

DETROIT ● CHICAGO

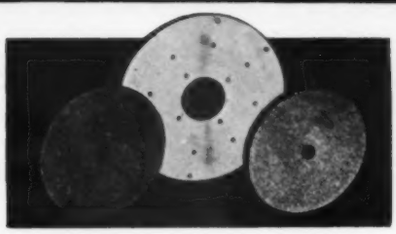
The Famous Ettco-Emrick DRILL CHUCKS • TAP HOLDING CHUCKS
TAPPING ATTACHMENTS • TAPPING MACHINES
MULTIPLE SPINDLE TAPPING AND DRILLING HEADS
Unexcelled for Design, Materials and Workmanship

STERLING Solutions for Troublesome Grinding Problems

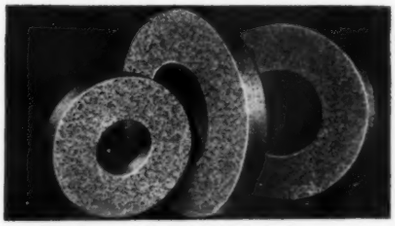
Sterling Centerless Grinding Wheels permit an important reduction in time of development of close tolerance cylindrical surfaces. By the creation of such wheel structures, Sterling economically speeds up production.



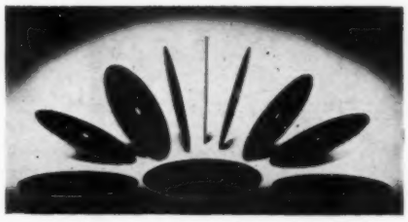
Sterling High Speed Grinding Wheels, shaped to the particular demands of your jobs, offer an economical, fast, trouble-free solution of problems incident to the shaping and finishing of unusual alloys.



Sterling Nut Inserted Disc Type Wheels are available in a wide choice of grains, bonds, sizes, and nut spacing, to fit the back plates of your present equipment.



For fine commercial finish and volume production, these Sterling Grinding Wheels are used for such materials as cast iron, bronze, and steel sleeves, and adapt themselves to cylindrical grinding, removing .0035" easily.



Sterling Cut-Off Wheels cut quickly and cleanly through hardened steels, marble, granite, tile and many other substances. These wheels do an economical job, and will cut bar steel to within 0.002",

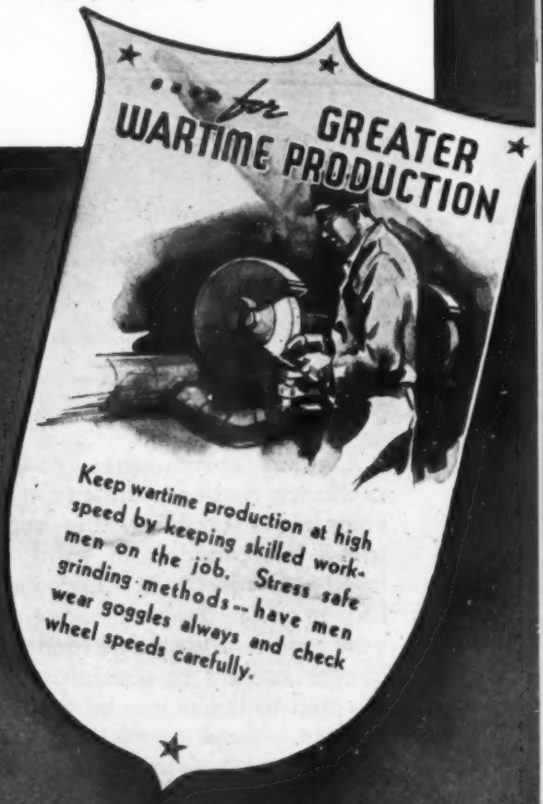
Tool room grinding demands specialized wheels built to the needs of each individual job. For quick, clean-cutting action on any alloy, specify Sterling WW Sterlith Vitrified.

The availability of the wide variety of Sterling Grinding Wheels is an important assurance that war production can continue at record-breaking speed. Wherever grinding operations must be quicker, you will find Sterling Grinding Wheels solving the time-saving problem.

Whatever grinding you may have to do, there are Sterling Grinding wheels of the proper size, shape, grain, and bond to accomplish the job in quicker time.

Ask for the services of a Sterling engineer. He is available for consultation anytime and, if you are already employing the correct wheels for the job, he may still have valuable ideas for using them in time-conserving manner.

Have you the new Sterling Catalog No. 40A? It is an important book of facts and figures you should have near at hand for ready reference. Write for it today--on your letterhead, please.

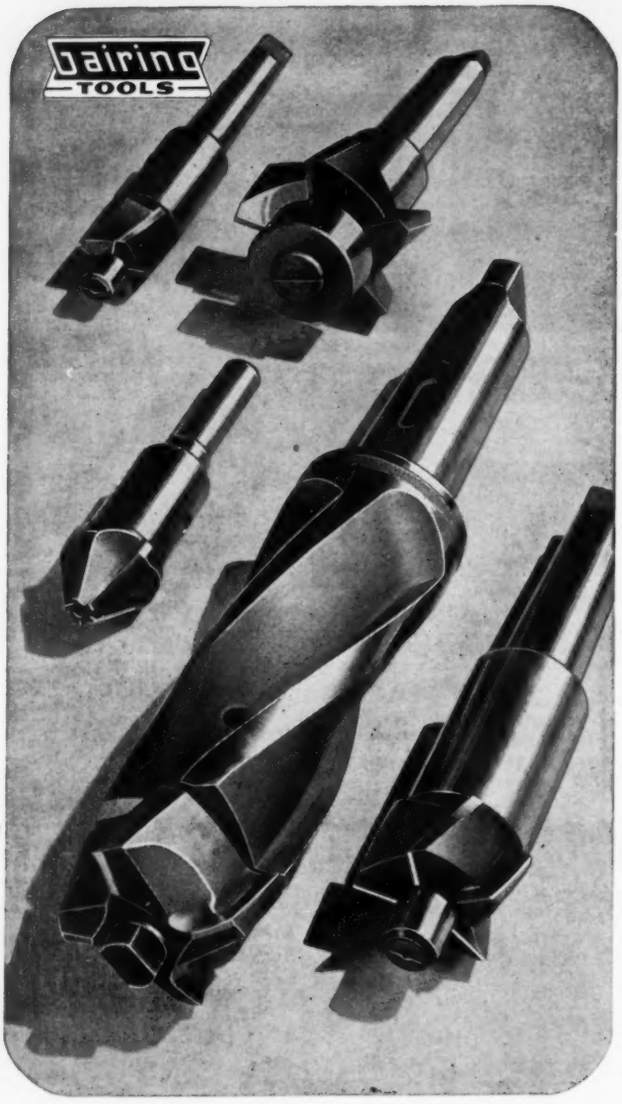

...for GREATER WARTIME PRODUCTION
Keep wartime production at high speed by keeping skilled workmen on the job. Stress safe grinding methods -- have men wear goggles always and check wheel speeds carefully.

• STERLING ABRASIVES •

THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

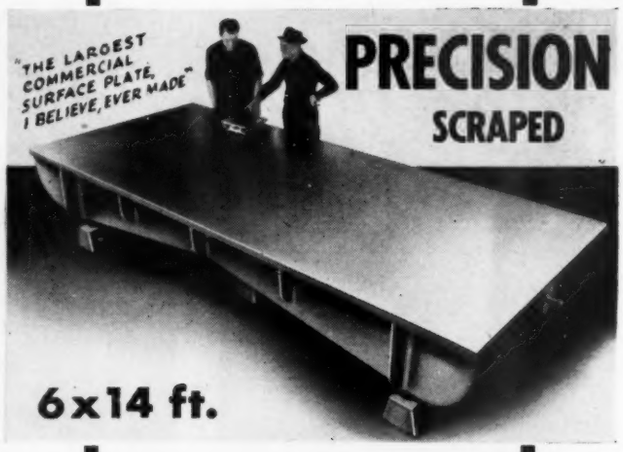
Standard Tools
All Types--All Sizes



Gairing counterbores, countersinks, back spotfacers and core drills (cutters, holders and complete assemblies) are supplied in high speed interchangeable, solid, adjustable and inserted blade types. Large stocks available for immediate delivery. Special sizes made to your order. Our modern facilities backed by a quarter century of specialized experience are devoted to the service of the metal cutting industries. *Make use of them.*

The Gairing Tool Co., Detroit, Michigan
In Canada, Hi-Speed Tools Ltd., Galt, Ont.

SPECIALISTS IN FINE CUTTING TOOLS FOR 24 YEARS



SURFACE PLATES FOR PRECISION INSPECTION

Despite its gigantic size, this surface plate (like all its smaller counterparts) exemplifies precision of a very high degree, over every inch of the surface from the center to the very edge.

Built of Meehanite—a specially processed iron recognized for its strength, uniform texture, and solidity through all sections. The design of this plate will prevent distortion or changes after once being scraped. All our plates resist deflection under reasonable load and retain their accuracy, due to the special form of ribbing that supports them. Ample clamping space is provided all around the edges.

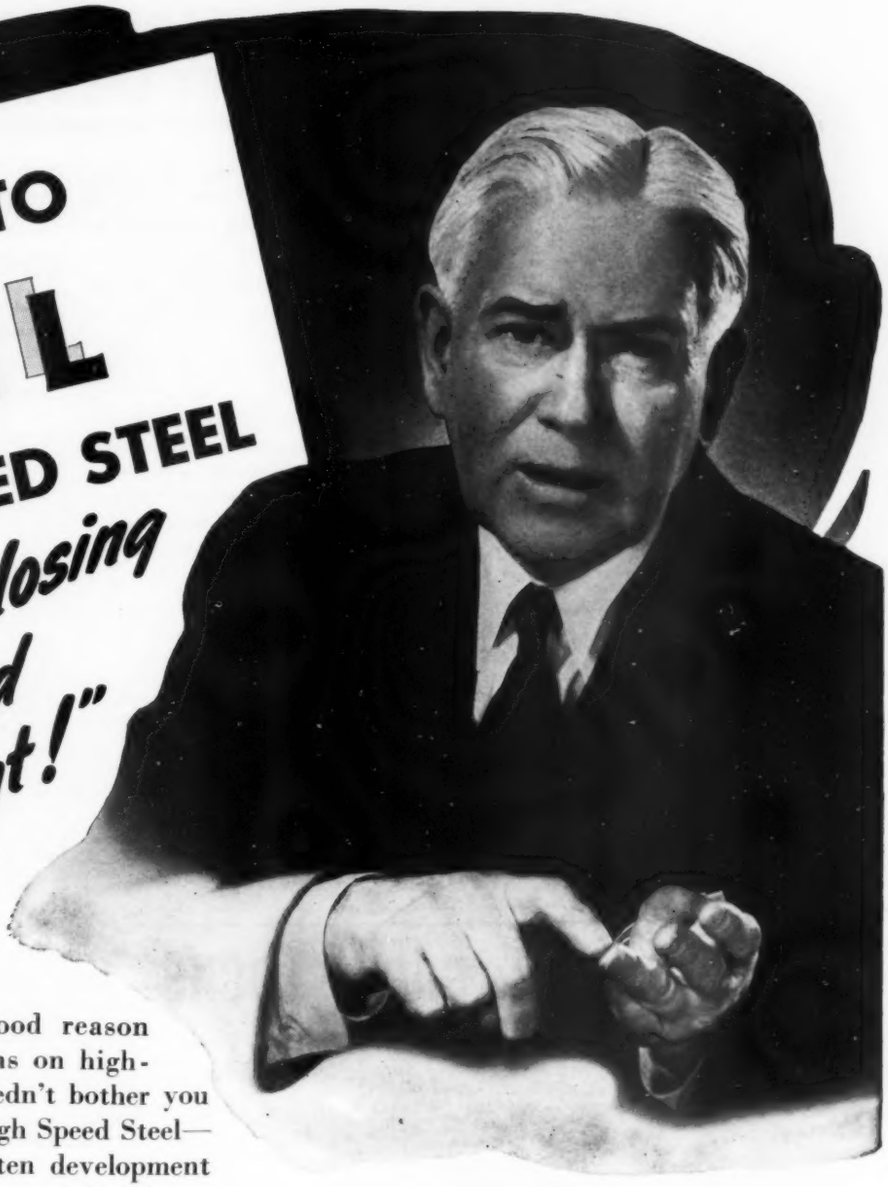
Sizes range from this large fellow illustrated above, 72 x 168 inches, down to 10 x 15 inches.

To keep plate level and flat, we have developed a specially constructed standard provided with unique supports. Locked to a fixed position these supports are designed to resist vibration.

Send for complete folder describing sizes and quoting prices.

MACHINE PRODUCTS CORPORATION
6769 E. McNichols Road • Detroit, Mich.

"SHIFT TO DBL HIGH SPEED STEEL ..without losing a second or a cent!"



★ There's a very good reason why OPM restrictions on high-tungsten tool steels needn't bother you a particle. It's DBL High Speed Steel—an exclusive low-tungsten development of our research which was perfected several years ago, especially with the strategic replacement of "18-4-1" in mind.

DBL is *one* tungsten "moly-type" High Speed Steel that slips into the place of 18-4-1 without a single hitch. You have nothing new to buy or to learn, because it heat-treats in the same equipment and by the same methods as 18-4-1. And you won't fall back a step in the production pace, because DBL performs as well as 18-4-1 in 85-90% of all cases, and frequently better!

Our Mill Service Staff is at your service in changing over to DBL or other A-L "moly-type" steels.

Mail the coupon below for the DBL "Blue Sheet," which contains complete technical data.

ALLEGHENY LUDLUM
STEEL CORPORATION — PITTSBURGH, PA.
Tool Steel Division — *Watervliet, N.Y.*

T-100

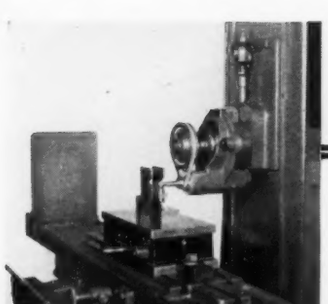
Allegheny Ludlum Steel Corporation
Oliver Building, Pittsburgh, Penna.

Send me a copy of the "DBL Blue Sheet."

NAME_____

COMPANY_____

ADDRESS_____



HORIZONTAL ATTACHMENT
Grinding Gaging Seat on Special Gage

VERTICAL ATTACHMENT
Grinding Clearance of Broach Teeth

LIBERTY HI-SPEED GRINDING ATTACHMENTS SAVE TIME IN SET-UPS . . . *on precision jobs*

More and more shops are taking advantage of the accuracy and speed on a wide range of tool, die and gage work assured by these new Liberty Grinding Attachments.

Designed for quick, simplified set ups—on Brown & Sharpe, Reid and other surface grinders—these precision-built, easily adaptable attachments provide for the widest possible variety of applications.

Investigate Liberty Hi-Speed Grinding Attachments for saving time in grinding gages, angles, slots, recesses and surfaces which are impossible to get at with large wheel. See for yourself how you can eliminate difficult and long expensive set-ups in which small wheels are a necessity.

Available for horizontal or vertical spindles, these units can be shifted to numerous positions. Can be attached in a few minutes.

Assembled complete with any size bores, pulley belts and grinding wheels at no extra cost. Write for Descriptive Bulletin.

To facilitate shipment, kindly specify diameter of spindle head, type and make of grinder in ordering.

EQUIP YOUR GRINDERS NOW Prompt shipments on standard units can be made if orders are placed immediately.

VERTICAL ATTACHMENT
Grinding Rectangular Opening in Trigger Casing

LIBERTY TOOL & GAGE WORKS
PROVIDENCE • RHODE ISLAND

WEBBER Precision GAGE BLOCKS

Prompt Delivery to manufacturers supplying required priority certificate

Set #81-B Standard working set. 81 Blocks in sizes from .050″ to 4.000″. Range .100″ to 12.000″ in steps of .001″ .200″ to 12.000″ in steps of .0001″. Accuracy—.000008″. Price $250.00.

Set #81-A Standard Inspection Set. 81 Blocks in sizes from .050″ to 4.000″. Range same as Set 81-B. Accuracy .000004″. Price $350.00.

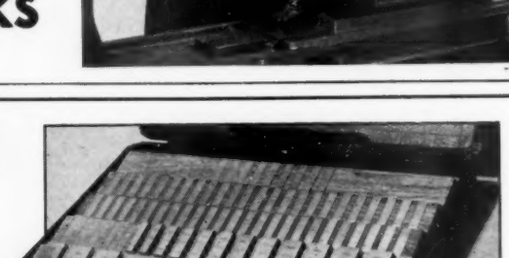
Set 40-B Recommended for use in the tool room and small production shop. 40 Blocks in sizes from .100″ to 4.000″. Range .200″ to 10.000″ in steps of .001″ .300″ to 10.000″ in steps of .0001″. Accuracy .000008″. Price $150.00.

Individual Blocks . . . For those requiring one or two gage blocks Webber furnishes individual standard size gages to meet such requirements.

WEBBER Rechecking Service. The complete facilities of the Webber plant and personnel are also available for rechecking gages and replacing any that may have become too worn to maintain absolute accuracy.

WEBBER Gage Service is complete. Try it.

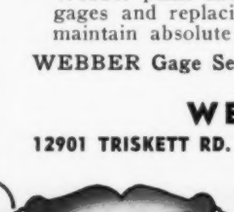
WEBBER GAGE CO.
12901 TRISKETT RD. **CLEVELAND, OHIO**



SET 81-B

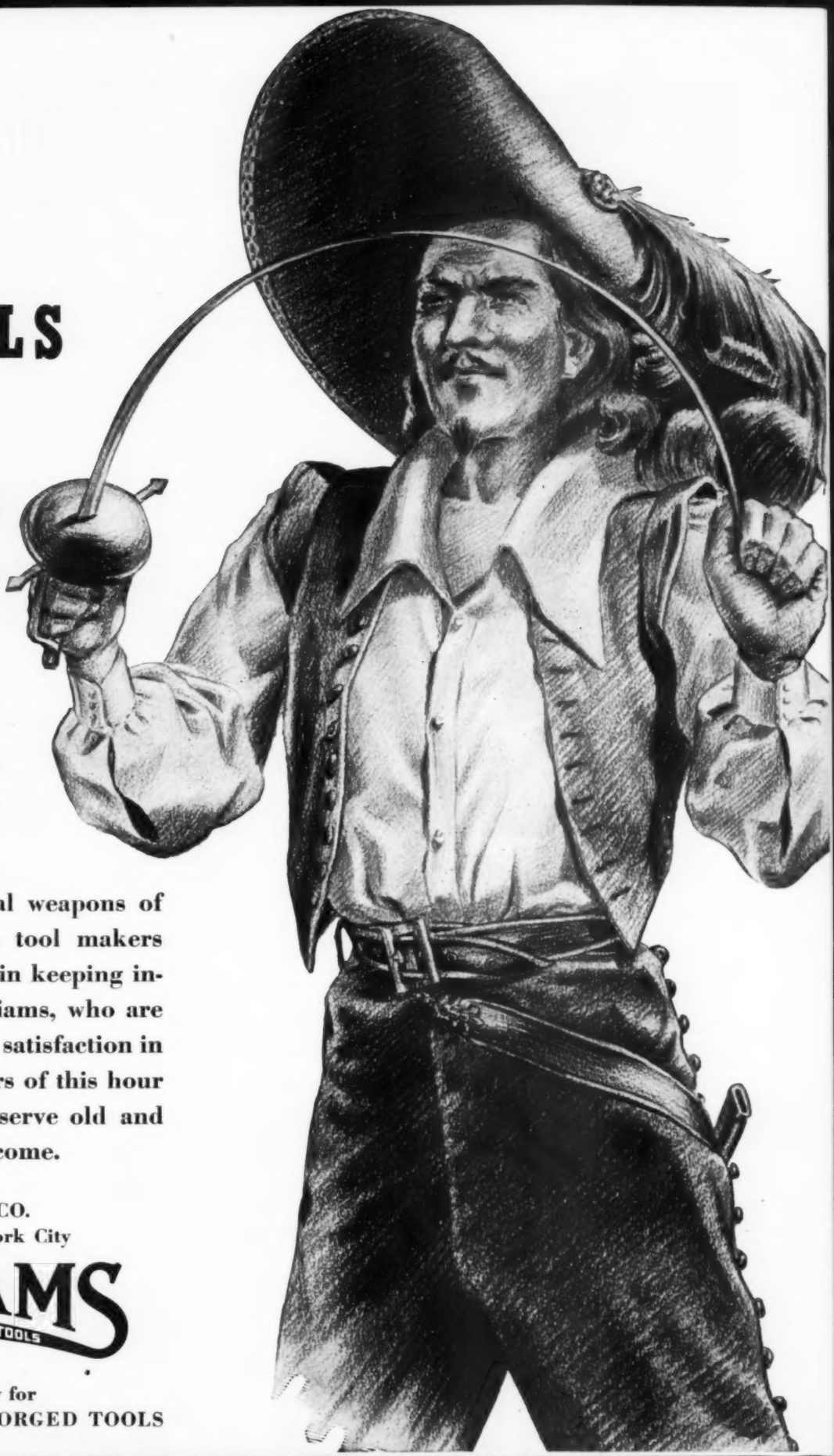
SET 40-B

INDIVIDUAL BLOCKS



WEBBER *Gage Company*
CLEVELAND...OHIO

GOOD TOOLS are the Sword Arm of Industry



WHETHER it be defense against aggression or insurance against the encroachment of business competition, good tools are vital weapons of industry. Today, America's tool makers face a critical responsibility in keeping industry efficient. We, at Williams, who are striving to do our part, find satisfaction in the knowledge that the rigors of this hour are equipping us better to serve old and new friends in the years to come.

J. H. WILLIAMS & CO.
225 Lafayette St., New York City

WILLIAMS
SUPERIOR DROP-FORGED TOOLS

Headquarters
for over half a century for
DROP-FORGINGS and DROP-FORGED TOOLS

TIMELY SUGGESTIONS

. . . for chuck users. Published by The Cushman Chuck Company in the interest of better service during the National Defense emergency.

HERE'S YOUR PRIORITY SITUATION "IN A NUTSHELL"

★ You are busy, we are busy, and it will help us both if we can avoid as many delays and save as much correspondence as possible. Hence these few suggestions regarding the placing of orders for Cushman Chucks, which as you know are classified by O. P. M. with machine tools and similar equipment.

First, please realize that all chucks now have a war job to do. We cannot accept any orders that do not carry proper authorization.

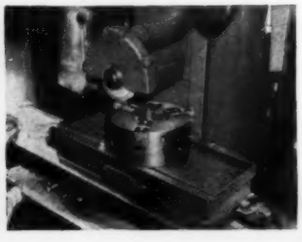
Secondly, bear in mind that forms PD25C, and PD25D cannot be applied on orders for chucks but do apply to orders for replacement parts.

Orders for chucks should always be accompanied by form PD3 or extension of a general preference order that is applicable to machine tools and similar equipment. Lathe chucks are not considered as a part of the "defense supplies" group.

Finally, please be sure that Cushman is anxious to do everything possible to help in solving your problems. Do not hesitate to call on us for any help or advice you may need, particularly in regard to conservation of your present Cushman Chucks.

Finish grinding of master jaws after fitting to assure interchangeability

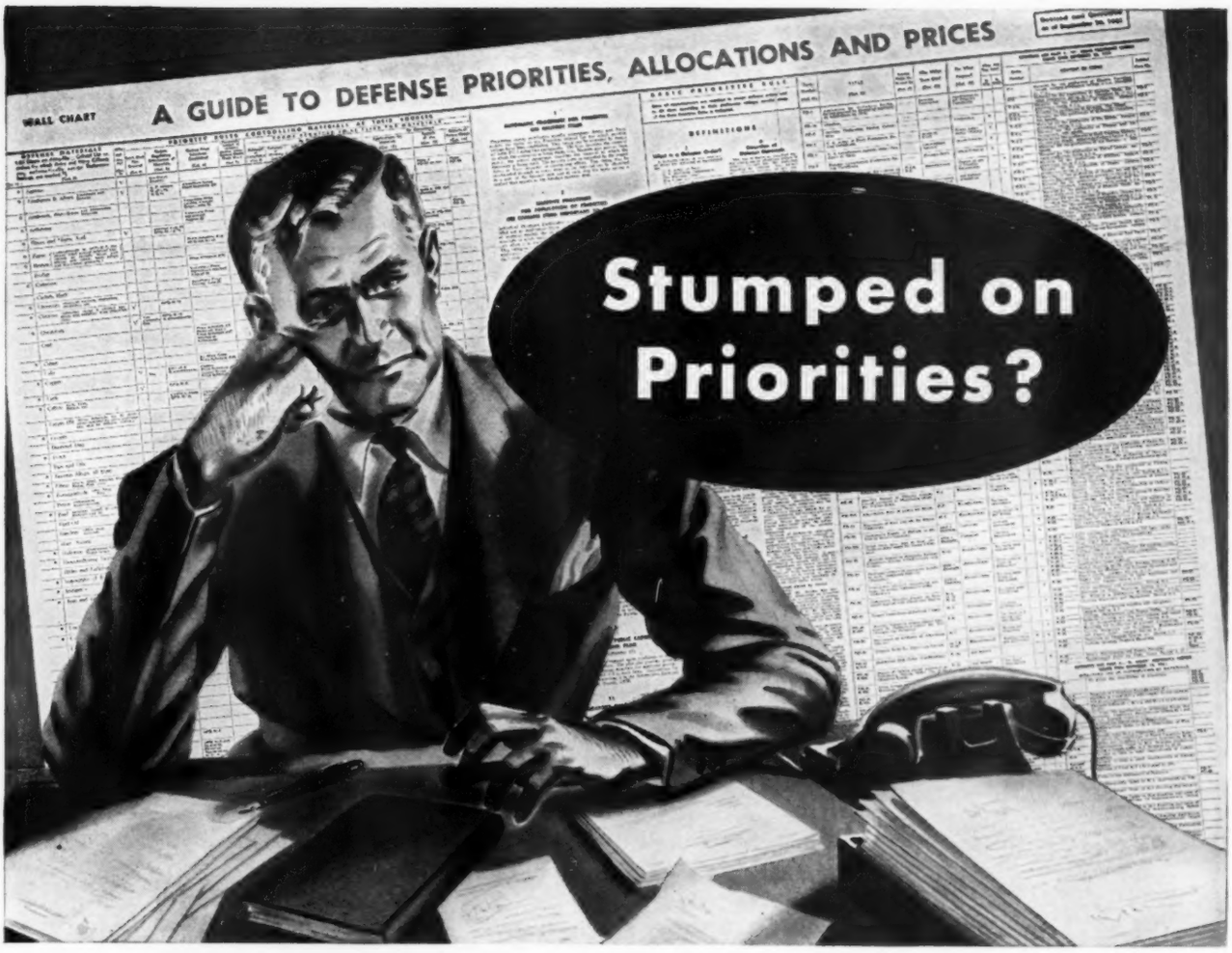
Balancing chuck bodies for tapered flange and long taper spindle noses



CUSHMAN

THE CUSHMAN CHUCK CO. HARTFORD, CONN.

CHUCKING ENGINEERS • SINCE 1862



Perhaps your Mill Supply Distributor can help you!

Today he carries approximately 12,000 to 20,000 items in stock. He buys a great part of them on priorities and naturally is compelled by law to sell them to customers who can produce priorities of their own.

Do *you* know how to obtain desperately-needed materials—even machine equipment—if you wish to bid a Defense sub-contract or to build up your own repair or emergency inventories? Your Mill Supply Distributor can doubtless help you to obtain and correctly fill out the necessary documents. Telephone him now!

Whether furnishing priorities or physical materials, your Distributor is at your call with service on the spot. The quick, helpful contact that he usually can supply is what *you* want when you buy—it's what *we* want in getting Cle-Forge High-Speed Drills and Peerless High-Speed Reamers across the map to you.

We long ago selected the country's leading Mill Supply Companies as exclusive Distributors for these and other Cleveland products.

This incident is typical of the unusual services that many Mill Supply Distributors are rendering their customers during the Emergency.

We favor adequate Preparedness for National Defense

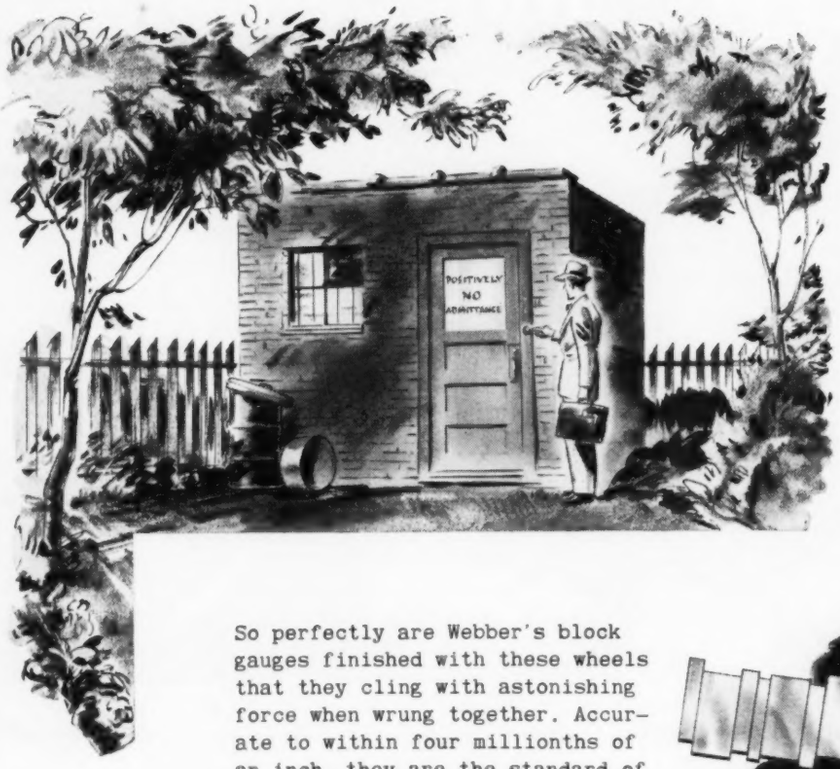
The CLEVELAND TWIST DRILL COMPANY
1242 EAST 49th STREET
CLEVELAND

TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES

30 READE ST. NEW YORK · 9 NORTH JEFFERSON ST. CHICAGO · 650 HOWARD ST. SAN FRANCISCO
6515 SECOND BLVD., DETROIT · LONDON - E. P. BARRUS, LTD. - 35-36-37 UPPER THAMES ST., E.C.4

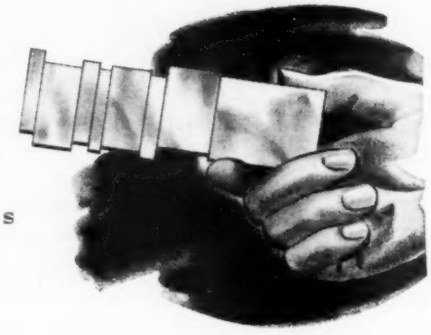
"CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU

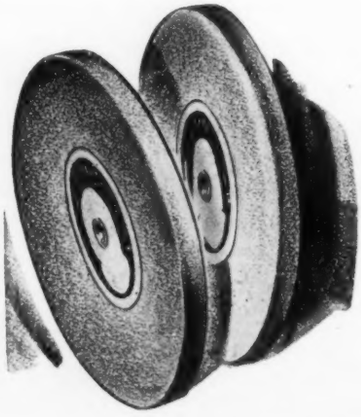
This is one of the most important manufacturing plants in America!



In this backyard shack George Webber of Cleveland is cracking a major defense bottleneck. He has found a way to produce in quantity those vital precision instruments known as block gauges. Few men have ever known how to finish these small blocks of steel to the microscopic accuracy required for modern mass production. Now Webber's secret machine turns out 37 sets, of 81 blocks each, every week with the aid of Aloxite Brand Aluminum Oxide Grinding Wheels.

So perfectly are Webber's block gauges finished with these wheels that they cling with astonishing force when wrung together. Accurate to within four millionths of an inch, they are the standard of measurement for thousands of precision parts essential to America's defense program.





Our ability to furnish the right product for any abrasive need is the result of outstanding research, engineering and manufacturing facilities. Perhaps we can help you speed up production and cut costs. The Carborundum Company, Niagara Falls, New York.

CARBORUNDUM
REG. U.S. PAT. OFF.
ABRASIVE PRODUCTS

Carborundum and Aloxite are registered trade-marks of and indicate manufacture by The Carborundum Company.

CLEVELAND PNEUMATIC TOOL

adds sales and service branches, expands plant capacity

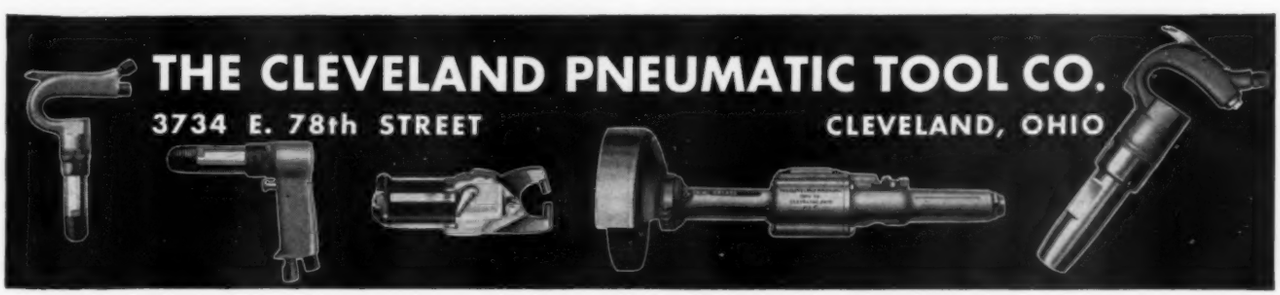
TO GIVE YOU *still better service!*

REALIZING more than 2 years ago that defense production would enormously increase the demand for pneumatic tools, we began a carefully planned program of expansion. By steadily increasing our personnel and plant capacity, Cleco Pneumatic Tool production has gone up over 300%. To facilitate our service still further, numerous branch offices have been added. As shown on the map above, our sales and service facilities are available in all parts of the country.

With all this growth, the superior quality of Cleco Tools has been carefully maintained. Today, Cleco Chippers, Riveters, Sand Rammers, Drills and Grinders, have the same outstanding reputation that has made them famous for over 40 years.

Now that war is upon us, and the nation cries for production and still more production, you can count on Cleveland Pneumatic for fast, thorough service in meeting your tool requirements.

Write for complete information on Cleco Pneumatic Tools



There is NO SHORTAGE of VICTOR BLADES

Having successfully absorbed our share of defense work, we can make full and prompt delivery of all orders for VICTOR Hack Saw Blades on our new National Emergency List. So can your VICTOR Distributor.

FREE BOOKLET "METAL CUTTING"

20 fact-packed pages on use, selection and care of hack saw blades and frames —liberally illustrated. Write for it.

VICTOR HACK SAW BLADES, formerly packed in modern metal boxes now come packed in the new cardboard Defense box.

VICTOR SAW WORKS, INC.
Middletown, N. Y.

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MUST MEASURE UP

to This Mark of Clover Quality

Why do Clover Coated Abrasives lead in cutting power, give longer sanding life and provide lower production costs? Because, throughout the process of manufacture, every element—backing, abrasive grain and glue—as well as the finished product, is under the alert scrutiny of Clover chemists and engineers.

Nothing is left to chance. Every precaution is so exercised that each Clover ingredient and each finished Clover product measure up to the Clover standard of quality.

COATED ABRASIVES AT THE RIGHT PRICES FOR YOUR EVERY SANDING NEED

If your distributor cannot supply you, write us direct. Also ask us for informative Abrasive Manual, and for free working sample offer. Address DEPT. H.

CLOVER MFG. CO., NORWALK, CONNECTICUT

ASK, ALSO, ABOUT CLOVER GRINDING AND LAPPING COMPOUND — FAMOUS FOR 38 YEARS

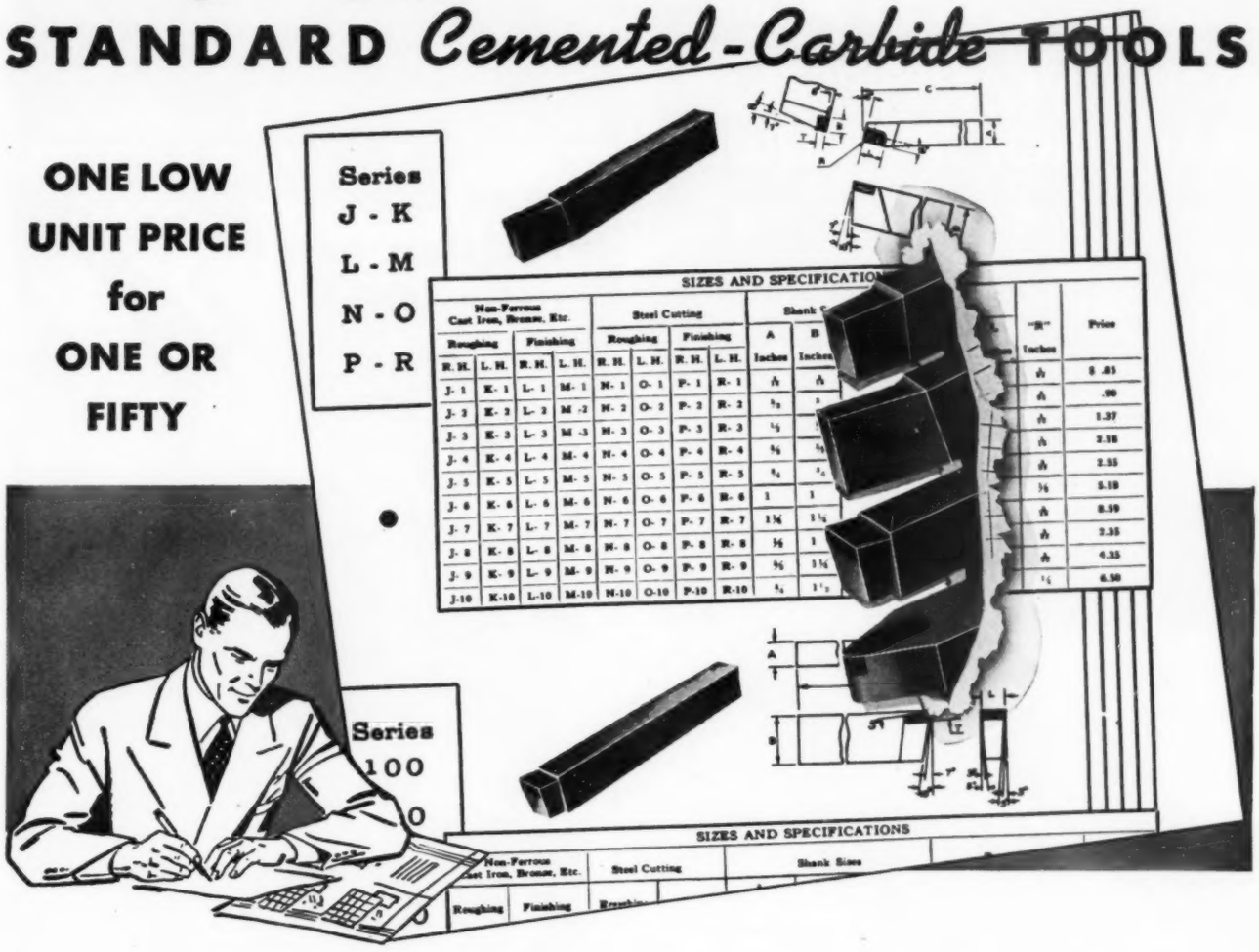
In the 38 years Clover Compound has been the first choice of expert machinists for precision lapping, over 40 million cans have been used,—each can demonstrating these long-famous Clover qualities • Perfectly graded, super-sharp, diamond-hard Silicon Carbide grain • Eight grades from microscopic fine to very coarse • Special heat-resisting petroleum hard oil binder • Withstands friction temperatures • Maintains uniform consistency and grain suspension • Fast-cutting • Cool-cutting • Does not burn work.

CLOVER
Coated Abrasives
Easily Identified by Color-Striping and the Famous Clover Trade Mark

QUALITY ABRASIVES SINCE 1903

Simplify THE ORDERING OF YOUR STANDARD *Cemented-Carbide* TOOLS

ONE LOW UNIT PRICE for ONE OR FIFTY



THERE'S no guesswork . . . no waste of time . . . no chance for error when you order the standard tools manufactured by Carbide Fabricators—the cemented-carbide division of Morse Tool Company. These tools are supplied in four series, each of which is broken down into types for roughing and finishing non-ferrous metals, cast iron, bronze, etc. and for roughing and finishing steel. The price range has been so simplified that the same low unit cost applies to one tool or fifty.

These standard tools are now being produced in large volume in a plant that is equipped entirely for cemented-carbide work. A large stock has been built up and will be maintained to the best of our ability to provide for 24 to 48 hour deliveries.

A four-page catalog folder listing all of the standard cemented-carbide tools manufactured by this company gives you *immediately* the exact information you require when ordering. Your order will get prompt attention and you will receive tools which will meet your most exacting production requirements. If you are not already supplied with an adequate number of folders so that every interested person in your plant will have one on hand, be sure to write for them today.

We are authorized suppliers of Carboloy, Firthite, Vascoloy-Ramet and Kennametal cemented-carbides.

Carbide Fabricators DIVISION OF

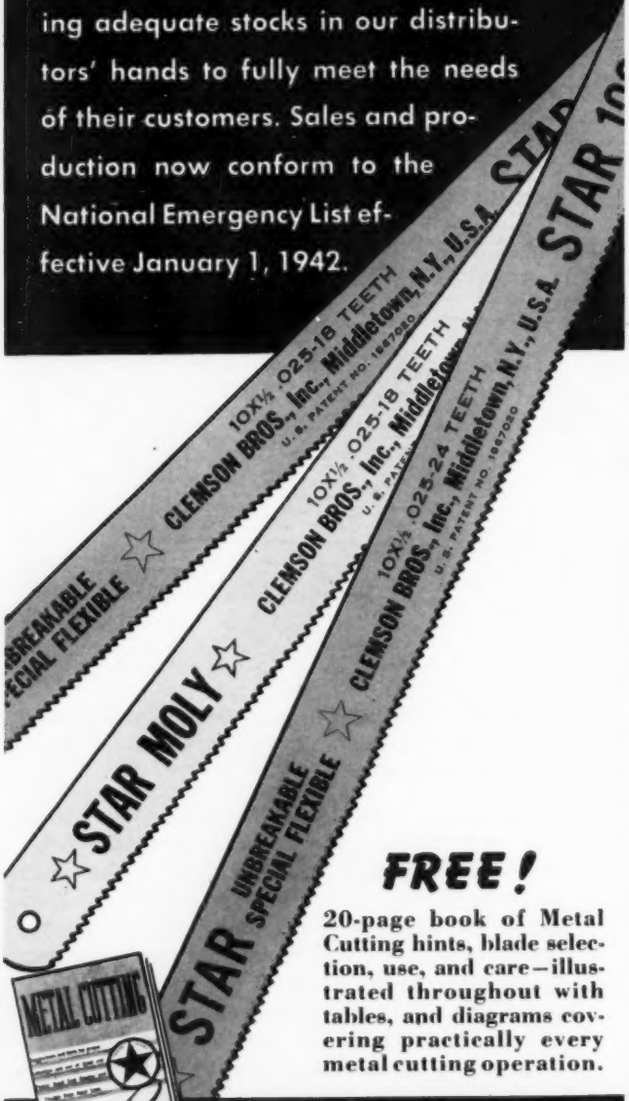
MORSE TOOL CO.

116 E. GOLDENGATE AVE.
DETROIT, MICHIGAN

CLEMSON

Is Prepared to Meet Present-day Demands for STAR HACK SAW BLADES

Having absorbed our full share of the Defense demands we are maintaining adequate stocks in our distributors' hands to fully meet the needs of their customers. Sales and production now conform to the National Emergency List effective January 1, 1942.



FREE!

20-page book of Metal Cutting hints, blade selection, use, and care—illustrated throughout with tables, and diagrams covering practically every metal cutting operation.

CLEMSON BROS., INC.
MIDDLETOWN, N. Y.

Please send me free metal cutting booklet.

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Address_____

City_____ State_____

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GROBET FILES *and* SAWS

Insure Greater Precision and Production . . .

. . . in 1942 by Standardizing on the "ORIGINAL" SWISS PRODUCTS

Back of Grobet Swiss Files is accumulated experience extending back one hundred and twenty-five years. These precision tools have long since been proved first for service, economy, speed and precision. By keeping pace constantly with the needs of file users, Grobet has been able to develop tools which are scientifically right for the service demanded of them. Completeness of the Grobet line will enable you to profit by standardizing on them for all your filing and sawing operations.

GROBET FILES for filing machines

These precision tools assure highest quality work from filing machines. They can be depended on to cut faster and wear longer. Made of chrome steel for maximum hardness; available for all types of machines. Send for catalog DM.

GROBET SAWS

The Grobet line include coil and blade style saws with flexible backs—saws that render long service and save money.

GROBET ROTARY FILES

Available from Grobet in hundreds of shapes—hand cut, milled cut, ground from the solid, and Diesinkers' Burs. Send for Catalog DG.

5000 GROBET Swiss Files for All Purposes

More than 5000 Swiss Precision Hand Files, in 9 numbers of cuts, are described in the Grobet Catalog DF. Send for a copy which gives full information on the complete line, shapes and types. Full information on Circular Saws, Small High Speed Steel Flat Drills, Gravers and Tools is also available on request.

Grobet File Co. of America

3 Park Place **New York, N. Y.**

NATIONAL Tools CLEVELAND

"WE CAN TAKE IT!"

VICTORY

While the treacherous Jap attack on Pearl Harbor has resulted in serious losses to American armed forces—it has also served to unify the people and awaken our nation to the full scope of the task ahead.

In meeting this gigantic task, National Tool Co. is putting forth every ounce of energy at its command. After many months of steadily increasing output we have again in the month of December showed a 12% increase.

An ever-growing volume of quality National Cleveland Tools is being poured forth to aid in the manufacture of America's weapons of War for Victory.

"WE CAN GIVE IT, TOO!"

THE NATIONAL TOOL COMPANY

11200 MADISON AVE.

CLEVELAND...OHIO

10 HOURS SAVED!

Turning This Long Forged Shaft With KENNAMETAL Tools

STYLE 12 TOOL

STYLE 21 TOOL

STYLE 6 TOOL

Previously this 45-ft. long rough forged steel shaft was turned to 7½" diameter with high speed steel tools in two cuts and with frequent "down time" for regrinding tools. By using two sharp KENNAMETAL tools on this job, roughing and finishing were combined in one cut, the speed was increased to 210 ft./min., and only one regrind per tool per shaft was required. As a result, KENNAMETAL reduced machining time from 13 hours to 3 hours; that is, completed the job in less than ¼ the previous time.

RECORD SALES PERMIT PRICE REDUCTION

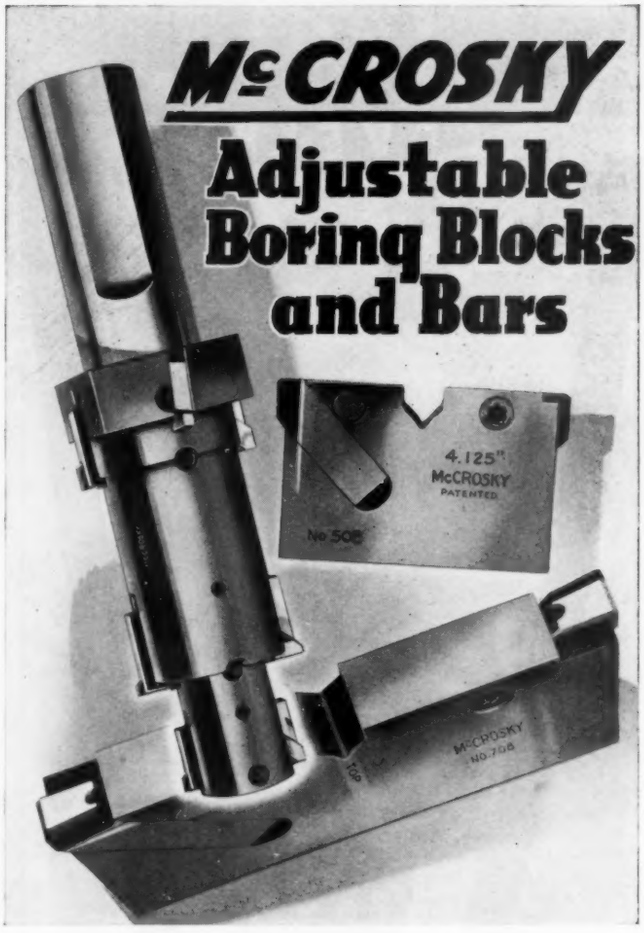
You need pay no more to use the best — KENNAMETAL costs no more than other carbides. Write for new Price List No. 7, effective Jan. 5, 1942. Do you have our Catalog No. 42?

KENNAMETAL
The Accepted
STEEL CUTTING CARBIDE

LARGEST MANUFACTURER OF STEEL-CUTTING CARBIDE TOOLS

McKENNA METALS Co.
103 LLOYD AVE., LATROBE, PENNA.
FOREIGN REPRESENTATIVES: U. S. STEEL EXPORT CO.
Exclusive of Canada, Great Britain and Possessions

Designed to Protect Boring Accuracy



WHEN the defense job you are tooling includes holes to be bored with extreme accuracy, investigate the advantages of the McCrosky Centralizing-V Lock. It centers the Adjustable Block in the bar with extreme accuracy and also provides close control of the amount of block float for the finishing cut. And it permits blocks to be inter-changed without removing the centering key from the bar . . . For complete details ask for McCrosky Bulletin 15-B.

McCROSKY TOOL CORPORATION
MEADVILLE — PENNSYLVANIA
CARBIDE CUTTING TOOLS

SUPER ADJUSTABLE REAMERS
JACK-LOCK MILLING CUTTERS
WIZARD QUICK-CHANGE CHUCKS
ADJUSTABLE BLOCK BORING BARS
SPECIAL PURPOSE TOOLS
McCROSKY TURRET TOOL POSTS

Uniformity

UNIFORMITY of size, shape, wear and cutting quality means the difference between efficiency and waste in abrasives.

MID-WEST honing stones are absolutely uniform in all characteristics because they are made with Micro-Super-X-Bond, hence their hardness and grain structure can be CONTROLLED to degrees never before attainable.

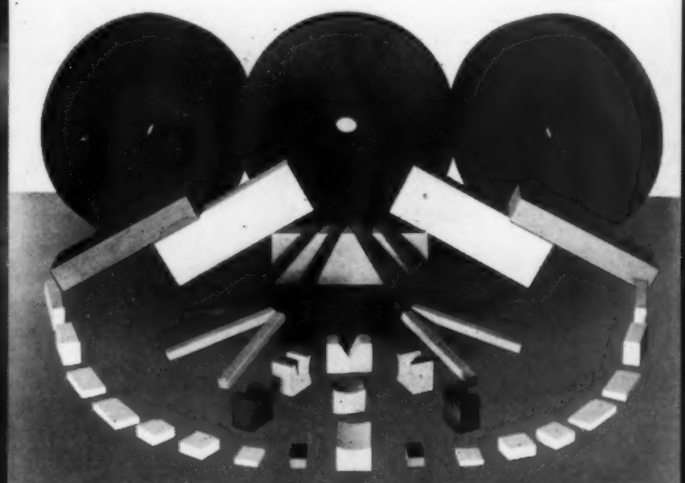
MID-WEST honing stones generate as much as 90 per cent less heat while cutting much faster than stones manufactured with any other bonding agent. Because they wear evenly they do their work more efficiently and because they last longer they turn out more work per set. To use MID-WEST stones is to save time and money.

MID-WEST stones, naturally, cost more than *average* honing stones. But their quality and performance make them more economical in the long run. MID-WEST engineers invite you to let Micro-Super-X stones help you solve your honing problems. Samples shipped from stock immediately.

MID-WEST ABRASIVE COMPANY

Manufacturers of grinding wheels, sandpaper and emery cloth

Owosso, Mich., Factory • Detroit, Mich., Executive Office • Rochester, Pa., Factory



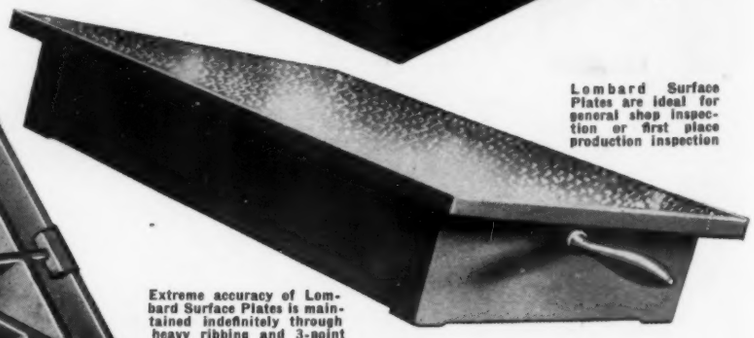
MID-WEST ABRASIVES

Prompt Deliveries on . . .

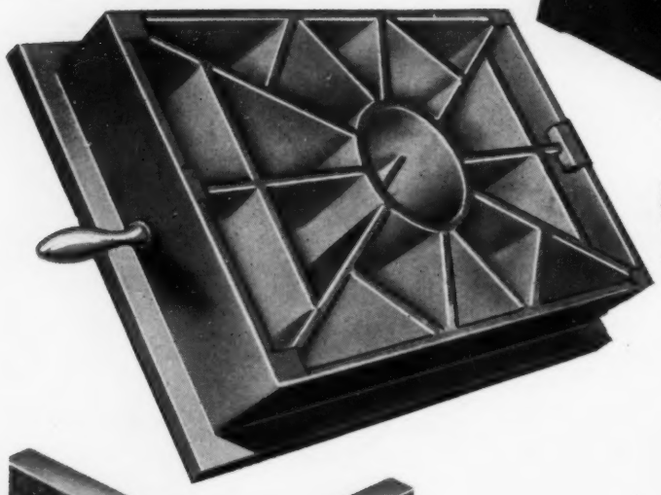
ACCURATE SURFACE PLATES

To shops needing high grade, accurate surface plates in a hurry, Lombard offers outstanding opportunities to meet those needs promptly. We are geared to produce these plates to the highest degree of precision where extreme surface accuracy is required.

Lombard Surface Plates are specially heat treated to relieve casting and machine strains. They are of extra rigid and heavy construction and carefully hand scraped to insure the closest limits of maintained accuracy.



Lombard Surface Plates are ideal for general shop inspection or first place production inspection

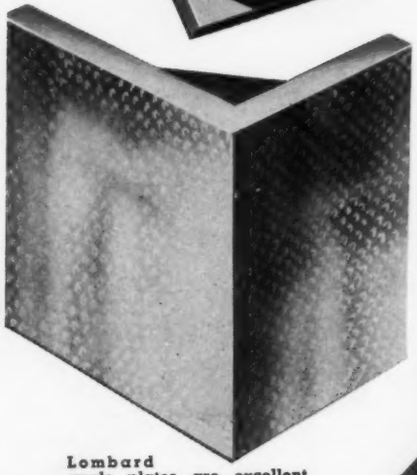


Extreme accuracy of Lombard Surface Plates is maintained indefinitely through heavy ribbing and 3-point suspension.

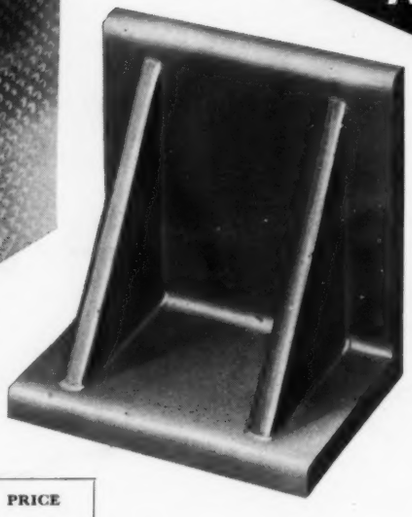
Available also with planed and hand lapped surfaces. Standard sizes available as follows:

Size 24" x 36" — weight 450#
Size 18" x 24" — weight 190#
Size 14" x 18" — weight 95#

ACCURATE ANGLE PLATES



Lombard angle plates are excellent for use in strapping work on milling and drilling machine tables, as well as general inspection use.



Lombard Angle plates are made of high grade quality, close grained semi-steel type iron. Through every stage of manufacture they are under rigidly supervised control. These plates are given special heat treatment to relieve casting and machining stress and insure a precise accurate angle plate after scraping. They are hand scraped slowly and carefully to produce a high degree of precision, and are particularly designed for use where extreme surface accuracy is required. The construction is extra rigid and heavy. Compare the weight of Lombard Angle plates with others, size for size. Planed surface and hand lapping plates also available.

SIZE (Inches)	WEIGHT (Approx. in Lbs.)	PRICE
4 x 4 x 6	12	$24.00
6 x 8 x 8	30	48.00
8 x 8 x 8	35	54.50
8 x 9 x 16	75	96.00
10 x 10 x 10	80	92.50
12 x 12 x 12	120	137.50
18 x 18 x 18	332	248.50

WRITE AT ONCE *for Details and Prices*

LOMBARD GOVERNOR CORPORATION, ASHLAND, MASS.

THE painstaking care of this old timer easing a blank through the tooth cutter is typical of the skill and attention to detail given to every process in the manufacture of "American Swiss" Swiss-Pattern Files. This experienced, conscientious craftsmanship is one of the reasons why these precision files are preferred by tool makers and machinists everywhere.

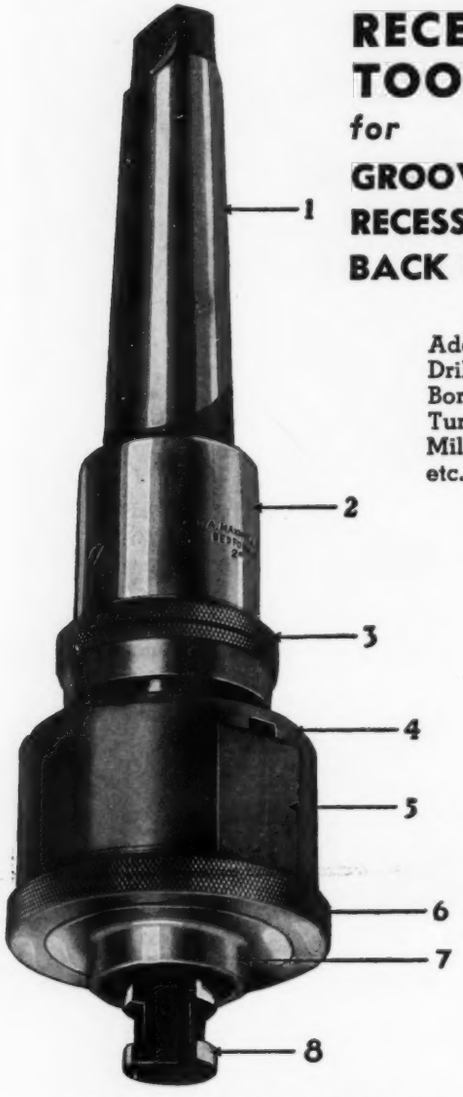
● *"American Swiss" Swiss-Pattern Files are available in over 3000 shapes, cuts and sizes . . . made in U.S.A.*

AMERICAN SWISS FILE & TOOL CO. • ELIZABETH, NEW JERSEY

American Swiss
SWISS-PATTERN FILES

MAXWELL

RECESSING TOOL for GROOVING, RECESSING, BACK FACING



Adaptable to Drill Press, Boring Mill, Turret Lathe, Milling Machine, etc.

1. **SHANK** is threaded and screwed into Body.
2. **DRIVING SLEEVE** is a sliding fit on Body Shank and is keyed to Shank, making a positive drive.
3. **STOP COLLAR** controls length of stroke and travel of Cutter. Travel of Cutter is equal to travel of Driving Sleeve.
4. **BODY.**
5. **CUTTER BLOCK** carries Cutter, in and out movement is actuated by movement of Driving Sleeve through medium of Gear and Rack.
6. **PILOT RETAINING COLLAR.**
7. **PILOT** is ball bearing. Remains stationary in job, revolving in Body.
8. **CUTTER** is H. S. Steel turned from the solid.

MADE IN 4 SIZES

1" Cap. (⅜" to 1" hole) Shank No. 3 Morse	$120.00
2" Cap. (1" to 2" hole) Shank No. 4 Morse	150.00
3" Cap. (2" to 3" hole) Shank No. 5 Morse	192.00
4" Cap. (3" to 4" hole) Shank No. 5 Morse	240.00

The above prices include one Pilot and one Cutter. Extra Pilots and Cutters quoted on request.

Write for complete folder.

F. A. MAXWELL CO.

BEDFORD **OHIO**

Increased production means more jobs for Machinists

—and MORE PAY

for men who know their work!

THIS home-study course gives you the facts on modern machine shop practice, new machines, up-to-date methods—a complete, practical training course—that you can use to improve your skill and advance your earning power now.

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6 Volumes, 2368 pages, 2516 illustrations, many charts and tables

THESE books answer your questions on methods and machines—tell what you need to know about the operation of machines of all types and sizes for the whole range of metal cutting, forming, and finishing operations—show by text, diagram, and illustration the essential points of setting up work, adjusting machines, selecting feeds and speeds, determining pressures, handling materials, devising short-cuts, etc.

What the Library gives you: description of all important varieties of machines, both manual and automatic; data on speeds and feeds, new cutting alloys and materials; practical information on grinding machines and abrasive wheels; exact, descriptive data on all aspects of gear-cutting practice;—the gist of more experience than any one man could amass in a lifetime of work.

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He is actively searching for surplus tools, supplies and materials which can be put to immediate use—he knows the inside of every local plant.

He is trying to anticipate your requirements—his preferred reply to any request is "We're sending it over right now!"

He'll help you find alternate items if the exact items you want aren't to be had anywhere.

He's an expert at supplying, just as you're an expert in manufacturing.

He's the short cut between you and your requirements for tools, materials and supplies.

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He's on the Job to Help You Help America—USE HIM!

Published in the interest of industrial distributors by

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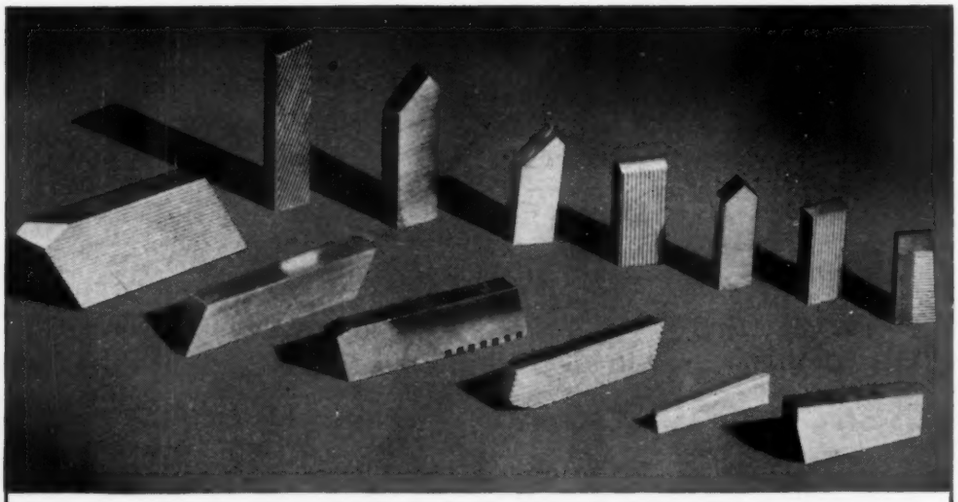
Since 1911, the ONLY magazine serving industrial distributors and their salesmen exclusively.

For Economical Production
USE HAYNES STELLITE TOOLS



Haynes Stellite Special Milling Cutter Blades

Shown above is a group of Haynes Stellite special milling cutter blades, typical of the many Haynes Stellite special tools which are available. Other special tools which are regularly cast and finish ground to users' specifications include blades for boring and reaming, form tools, spot facers, welded tip tools, counterbores, reamers, and brazed-in-blade milling cutters.

Wide Range of Tool Applications

Haynes Stellite alloy tools are economical because these uniform, dependable tools operate at high speeds with long life between grinds —at a low cost per piece machined. These tools are used for machining practically all machinable materials, except chilled cast iron and manganese steel. Specific operations include turning, facing, boring, reaming, milling, grooving, cutting off, forming, spot facing, core drilling, and counterboring.

Standard Tools Stocked for Immediate Delivery

1. Solid Tool Bits—Wide range of square and flat sizes.
2. Welded Tip Tools—Large variety of styles and sizes.
3. Milling Cutter Blades—Various types for many cutter bodies.

★ ★ ★

Write or phone the district office nearest you for complete information on standard and special Haynes Stellite tools.

HAYNES STELLITE TRADE MARK

Red hard, wear-resisting alloys of cobalt, chromium and tungsten

HAYNES STELLITE COMPANY

Unit of Union Carbide and Carbon Corporation

New York, N. Y. UCC Kokomo, Indiana

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• HIGH-PRODUCTION METAL-CUTTING TOOLS •

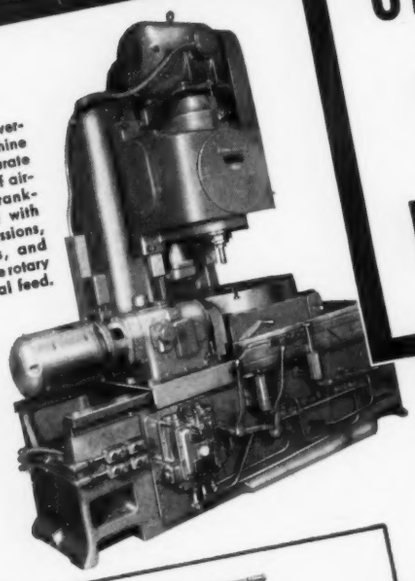
"Haynes Stellite" is a registered trade-mark of Haynes Stellite Company.

Presses, Forging and Molding Machines

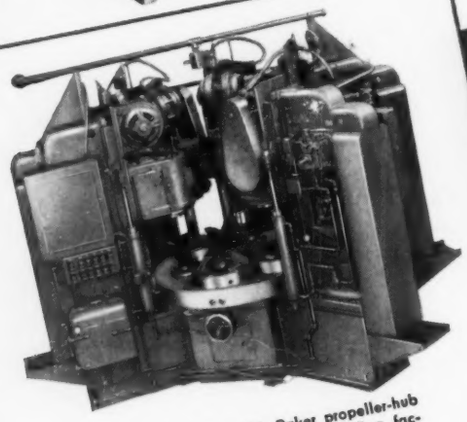
Mechanical Presses · Hydraulic Presses · Shears and Brakes · Forming Rolls and Benders · Forging Machines · Die Casting Machines · Plastic Molding Machines · Wire Forming Machines

● AMERICAN MACHINIST'S 29TH ANNUAL BUYERS REFERENCE NUMBER

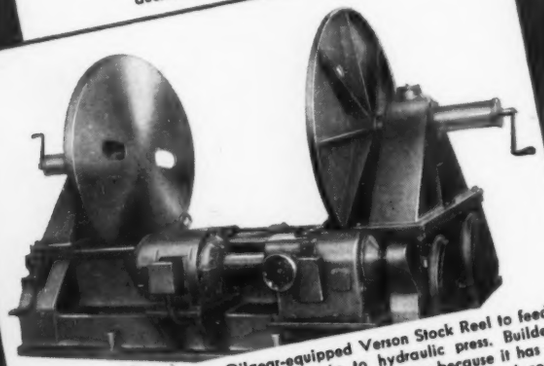
OILGEAR FLUID POWER HELPS YOU ANSWER *Vital* MACHINE DESIGN PROBLEMS



Davis & Thompson vertical milling machine for high speed accurate milling of inside of airplane engine crankcases. Equipped with Oilgear Transmissions, Pumps, Valves, and Cylinders to drive rotary table and lateral feed.



Five Oilgear Units in this Baker propeller-hub drilling machine perform 5 steps of drilling, facing, and chamfering to speed up propeller production for defense.



Oilgear-equipped Verson Stock Reel to feed cold-rolled strip to hydraulic press. Builder says: "We selected Oilgear because it has a range beginning at absolute zero and continuing up to maximum feed; also may be smoothly and almost instantly reversed."

FOR ease of power transmission application, for versatility of installation, for maximum production of your machines, for long, troublefree operation in the field . . . your best answer is Oilgear Fluid Power Pumps, Motors, Transmissions, Cylinders, and Valves. Note the varied applications of Oilgear shown on this page; they are a trifling few of the many tough machine design problems solved by manufacturers in many fields.

Oilgear Fluid Power Systems are compact, simple, easy to install. They present smashing advantages over mechanical drives and other hydraulic systems. They may be used with any kind of drive—belt, chain, gear, or direct—and require a minimum of piping and space. They offer a wide range of standard sizes and controls permitting you to custom-fit Oilgear Systems to the speed, power and function specifications of practically any machine. Speeds are steplessly variable from zero to maximum in either direction; ratios between feed and rapid traverse are high; feed speeds can be controlled with *micrometer* accuracy; reversals are fast, cushioned and controlled; lubrication is automatic with Oilgear Fluid Power Units. Pre-set operating speeds in either direction, remote control by push-button stations and automatic pressure unloading are a few of the advantages of the many different types of Oilgear standard controls.

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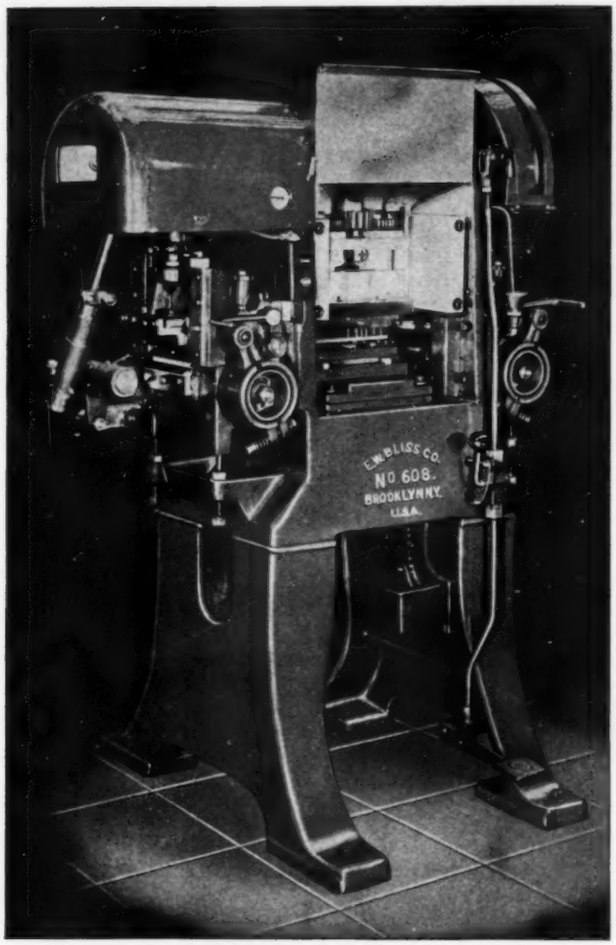
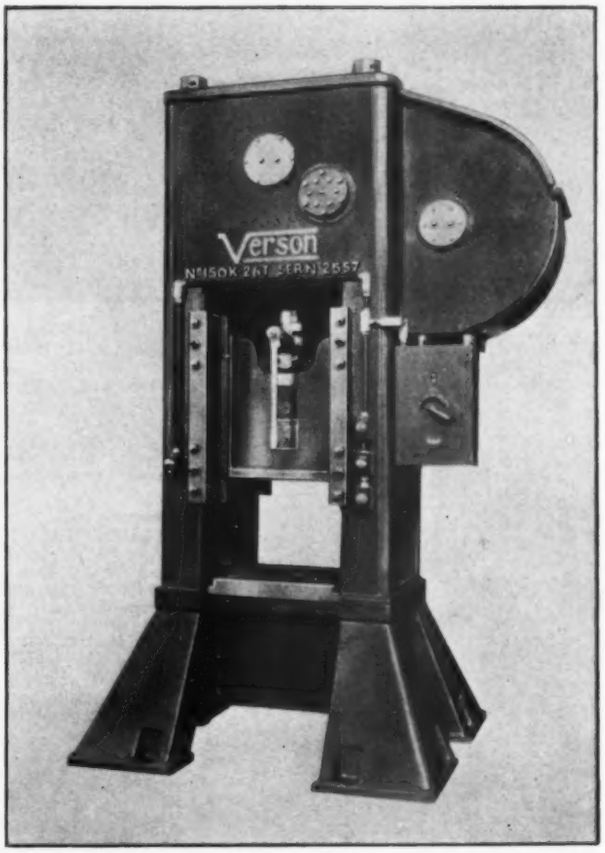
PRESSES, FORGING and MOLDING MACHINES



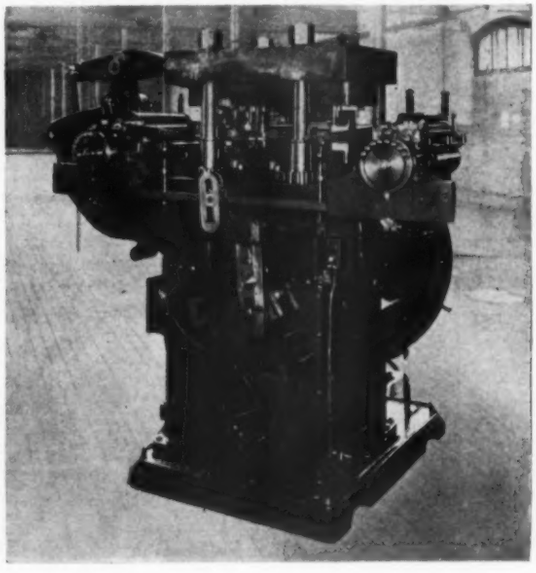
HIGH-PRODUCTION PRESS—*E. W. Bliss Co.*, 53rd *St. and Second Ave., Brooklyn, N. Y.* No. 608 high-production press develops speeds up to 1,200 strokes per minute. Distance from bed to slide with adjustment up, 7 in.; standard stroke, ¼ in.; face of slide, 7×10 in. Vol. 85, p. 32.

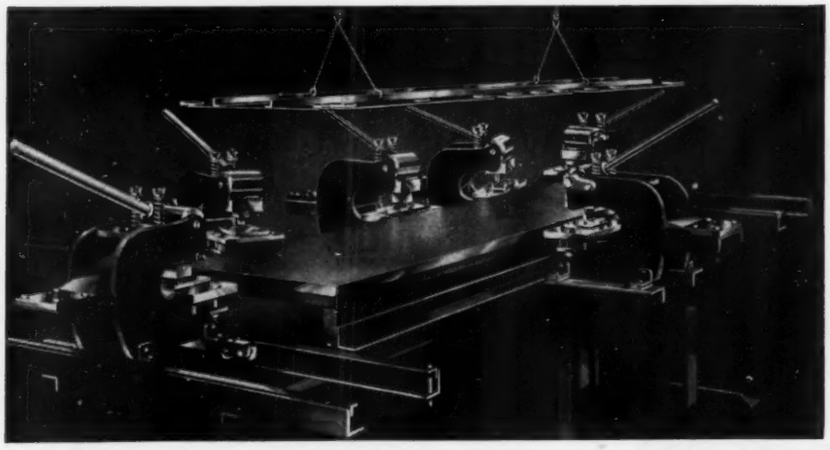


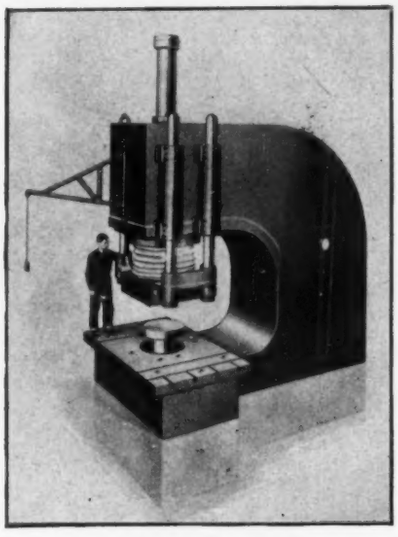
KNUCKLE JOINT PRESS—*Verson Allsteel Press Co.*, 93rd *St. and South Kenwood Ave., Chicago, Ill.* Providing a long stroke and long adjustment without sacrificing desirable knuckle action of the more common type of knuckle joint and embossing presses, this press has a frame consisting of four main sections, welded from quality steel plates into rigid box type units of great strength. Size shown has 150-ton capacity, 5-in. stroke, 5½-in. slide adjustment, 26×26 in. bed area, and operates at 50 strokes per minute. Vol. 85, p. 779.

DIEING MACHINE—*Henry & Wright Mfg. Co., Hartford, Conn.* Dieing machine tooling adapted to quantity production of metallic belt links for use in machine guns is equipped with automatic double-roll feed which feeds the material during only 120 deg. of the crankshaft revolution. The 60-ton dieing machine will produce 130 to 140 links per min. for the .30-cal. machine gun. Vol. 85, p. 734. →

← FOUR-POINT PRESS—*Cleveland Punch & Shear Works Co.*, 3900 *St. Clair Ave., Cleveland, Ohio.* This four-point press, identical front and back with no overhanging brackets or other projections, measures 108 in. between the uprights and exerts a pressure of 500 tons. Speed, 14 strokes per minute; stroke, 24 in. Vol. 85, p. 672.

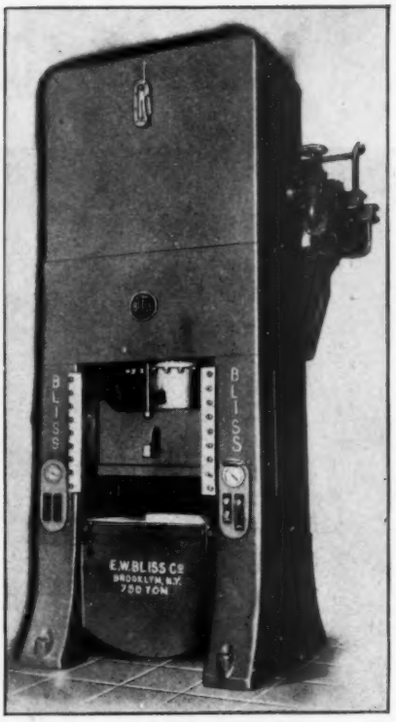






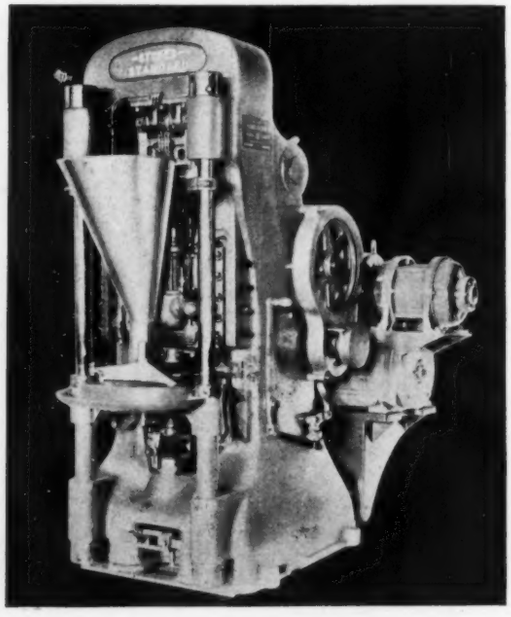
HAND-OPERATED PUNCH PRESSES—*Leslie Welding Co., 2943 Carroll Ave., Chicago, Ill.* Model A positive alignment hand-operated punch presses have a 6 in. throat and take dies up to 4 × 4½ in. Capacity is a 2 in. hole in No. 10 gage mild steel. A non-rocking feature makes possible punching of half holes or notching. Vol. 85, p. 1300.

HYDRAULIC PRESS—*Denison Engineering Co., 119 W. Chestnut St., Columbus, Ohio.* This C-frame hydraulic press combines the main ram, rapid traverse cylinder, and a stripper cylinder operating through the bolster, has a main press cylinder of 400 tons capacity, a 30-in. stroke, is single acting, and has a 36 × 36-in. platen provided with T-slots. Oil reservoir, hydraulic pump and motor, motor starter, electrical controls and control valves are assembled within the frame. Vol. 85, p. 507.

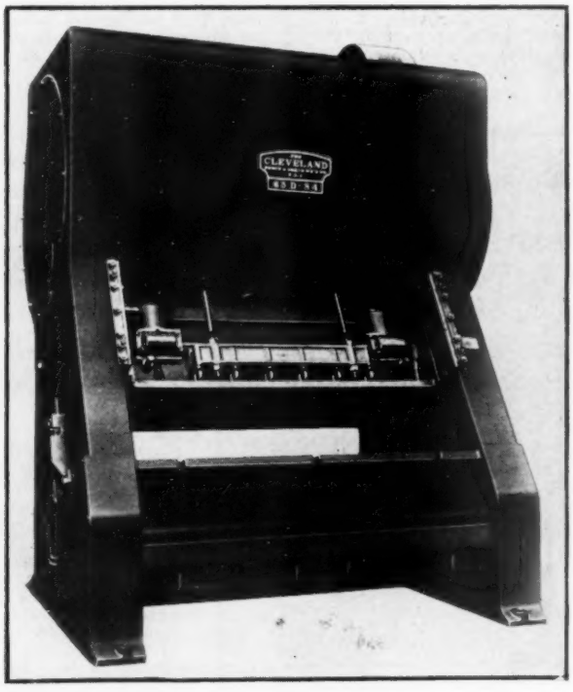


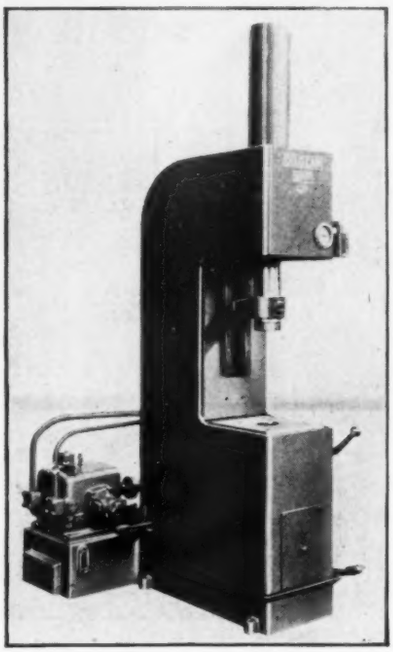
HYDRO-DYNAMIC PRESS—*E. W. Bliss Co., 53rd St. and Second Ave., Brooklyn, N. Y.* An unusual feature of the 750-ton "Hydro-Dynamic" press is an intermediate cylinder giving a higher speed at low pressures (under 350 tons) while still making available the maximum pressing capacity of 750 tons at normal pressing speed. Vol. 85, p. 405.

POWDER METALLURGY PRESS—*F. J. Stokes Machine Co., 5930 Tabor Rd., Philadelphia, Pa.* With the No. 280 self-contained, cam-operated, toggle-type press is speed up to 50 strokes per min., while pressure is applied slowly and smoothly and maximum density is secured. The press is suited for production of parts of comparatively thin section and large diameter. Vol. 85, p. 407.



DOUBLE CRANK PRESS—*Cleveland Punch & Shear Works Co., Cleveland, Ohio.* This straight-sided double crank press is set at a permanent incline of 30 deg. for gravity discharge of finished pieces into tote boxes placed at rear of the press. Of four-piece tie-rod construction, it is single geared and equipped with electrically controlled hydraulic friction clutch and brake. Speed, 45 strokes per minute; bed area, 30x84 in.; stroke, 3 in.; adjustment of slide, 3½ in. Vol. 85, p. 1116.

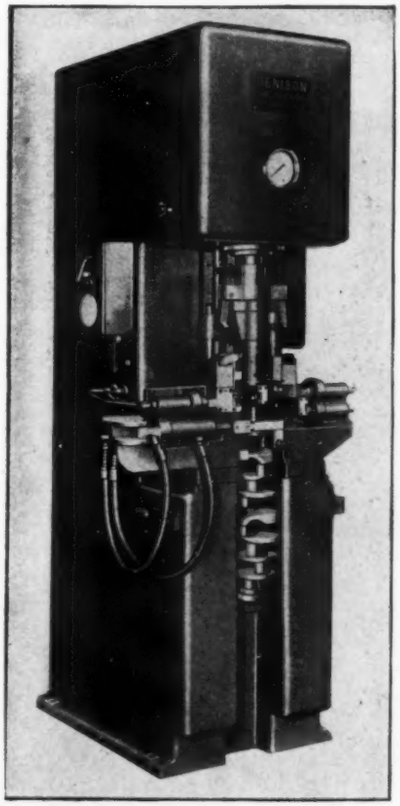




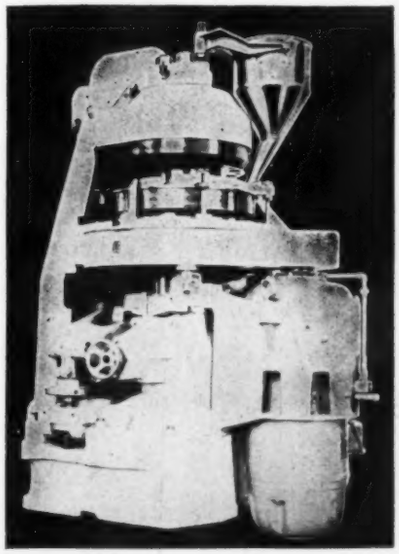
GOOSENECK PRESSES—*Oilgear Co.*, 1302A *W. Spruce St., Milwaukee, Wis.* Gooseneck presses of 6 to 25-ton capacity for fast, easy and accurate forcing, stamping, broaching, assemblying, and straightening are made with plain platens and with lower platens arranged to receive detachable tables or fixtures. Vol. 85, p. 1166.

HYDRAULIC PRESS—*E. W. Bliss Co.*, 1420 *Hastings St., Toledo, Ohio.* This two-point inclosed type hydraulic press with a capacity of 315 tons has a hydraulic friction clutch, a hydraulic brake and an air counterbalance. Clearance between uprights, 87 in. Vol. 85, p. 1072.

HYDRAULIC PRESSES — *Colonial Broach Co.*, 147 *Jos. Campau, Detroit, Mich.* Designed primarily for small parts, ½ and 1 ton junior presses have platen depth of 9½ in., platen width of 14 in., with 2½ in. slot and throat depth of 5½ in. Vol. 85, p. 1344.

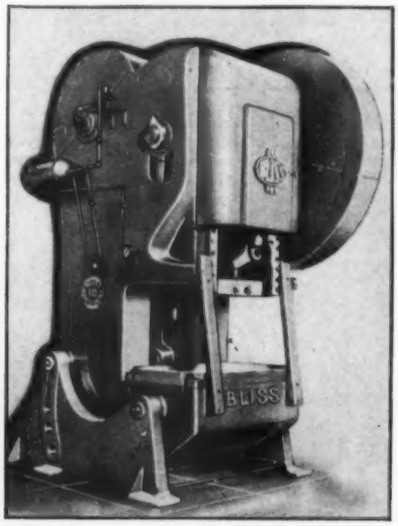


HYDRAULIC PRESS—*Denison Engineering Co., W. Chestnut St., Columbus, Ohio.* A 5-ton hydraulic press has been adapted for assembling keys and timing gears on automobile crankshafts. Vol. 85, p. 1002.

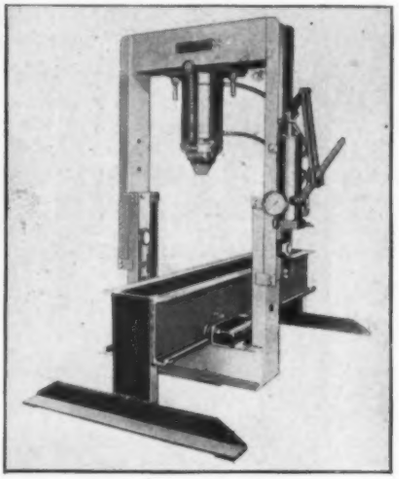


ROTARY TABLET COMPRESSOR—*F. J. Stokes Machine Co.*, 5930 *Tabor Rd., Philadelphia, Pa.* The output of this large rotary tablet compressing machine is 150 pieces per min. when all ten punch and die sets are in use. Capable of applying 30 tons pressure and producing parts with a maximum diameter of 2½ in., this machine has a maximum die fill of 4 in. Vol. 85, p. 406.

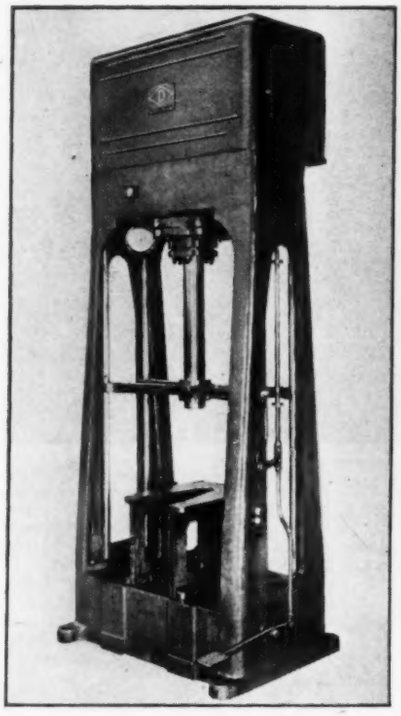
HYDRAULIC PRESS—*Bee Line Co., Davenport, Iowa.* This 125-ton industrial hydraulic press, mounted on a movable roller bearing carriage, permits the application of pressure at any point in an 84×34-in. area bed. Jack carriage can be raised or lowered 16 in. with minimum space between ram and bed of 2 in. Maximum space is 28 in. Ram travel, 10 in. Vol. 85, p. 1344.



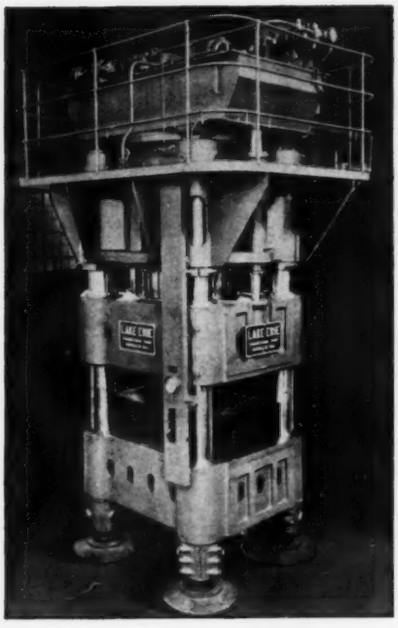
INCLINABLE PRESS — *Consolidated Press Div., E. W. Bliss Co.*, 53rd *St. and Second Ave., Brooklyn, N. Y.* This No. 10 general purpose inclinable press has all gearing and other working parts inclosed for greater safety. Stroke ranges from 8 to 12 in. Vol. 85, p. 132.



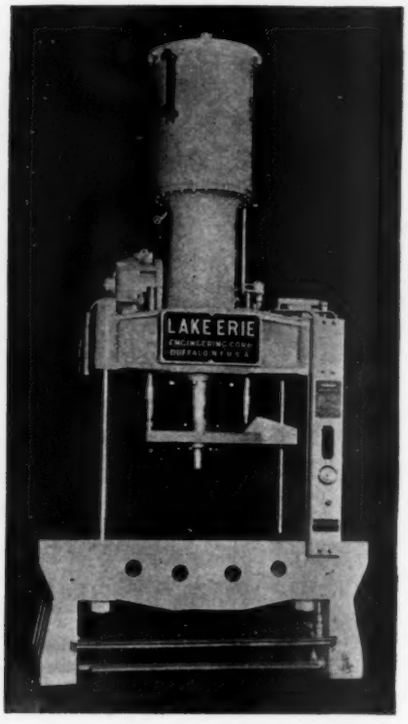
PRESSES, FORGING and MOLDING MACHINES



HYDRAULIC PRESS—*Diamond Machine Co., Philadelphia, Pa.* The overall height of the "Diamond 40" press, for assembling, broaching, straightening, riveting, forcing and pressing operations, is 9 ft. 7¾ in., floor space required is 2 ft. 8 in. × 3 ft. 8 in. Relief valves in the oil circuit protect against overloading the press with work. Vol. 85, p. 627.



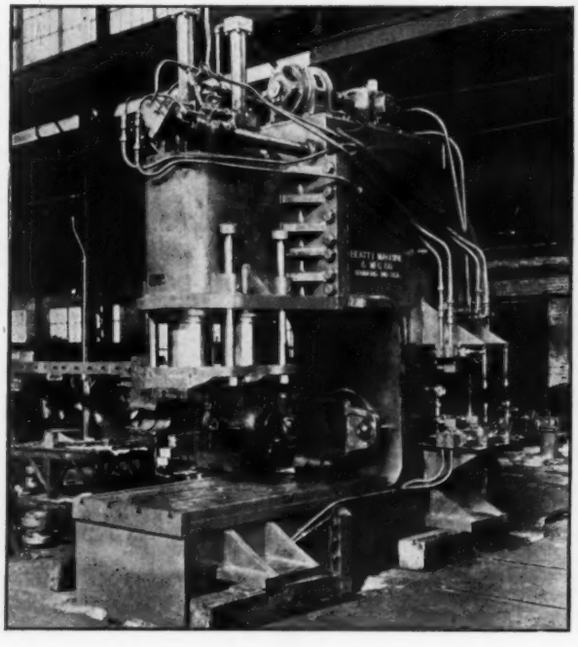
HYDRAULIC PRESS—*Lake Erie Engineering Corp., Buffalo, N. Y.* This 5,000-ton single action hydraulic press, furnished with rubber pad and steel bolster together with automatic motorized loading tables for high production of aircraft parts, is self-contained with pumping unit located on top. Vol. 85, p. 511.

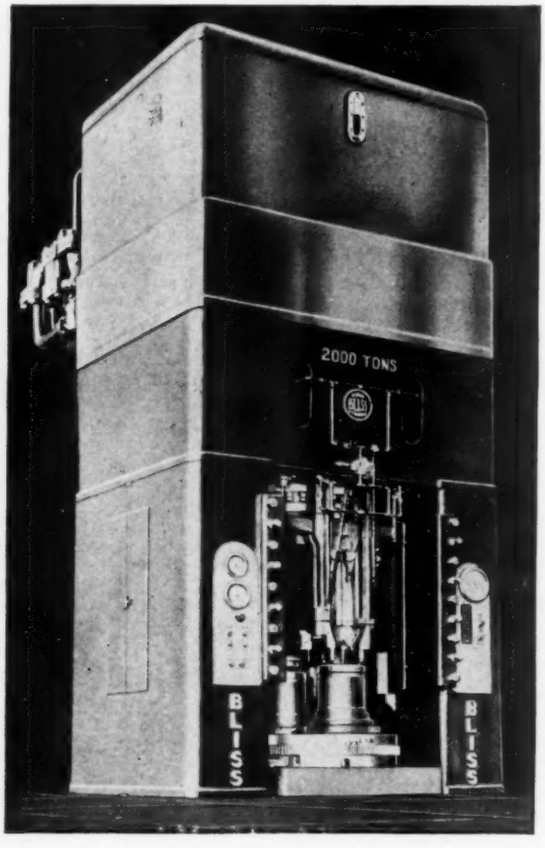


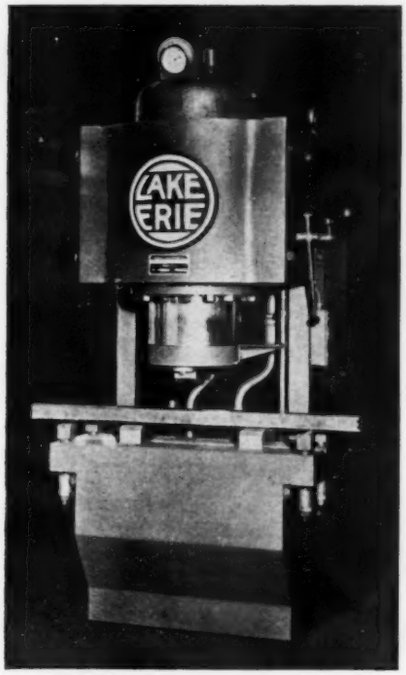
HYDRAULIC PRESS—*Lake Erie Engineering Corp., Buffalo, N. Y.* This 100-ton hydraulic press for straightening light armor plate and bars is self-contained, with its pumping unit mounted on top. Vol. 85, p. 828.

HYDRAULIC PRESSES—*E. W. Bliss Co., 53rd St. and Second Ave., Brooklyn, N. Y.* Of four-piece frame construction, entirely self-contained, hydraulic presses of 1,500 and 2,000 ton capacities for cartridge case heading are operated by a 75-hp. motor on the main drive and a 7½ hp. motor on the ejector drive. Vol. 85, p. 1115.

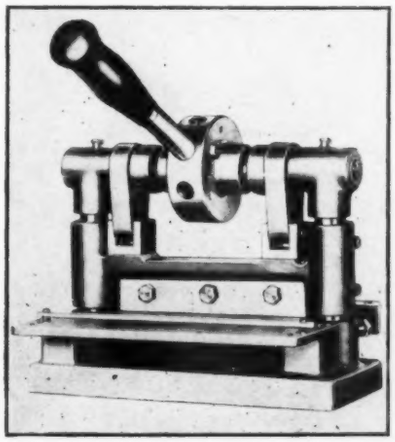
FLANGING AND FORMING PRESS—*Beatty Machine & Mfg. Co., Hammond, Ind.* Each of the two vertical cylinders and the horizontal cylinder of the Model 1985 high speed flanging and forming press is equipped with a single-acting main ram and a double-acting small cylinder to give high speed on advance and return stroke, thereby increasing the production of the press. Vol. 85, p. 827.



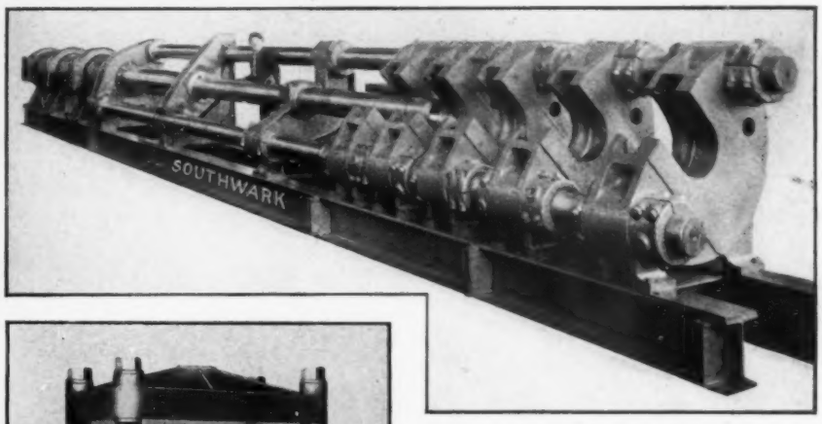


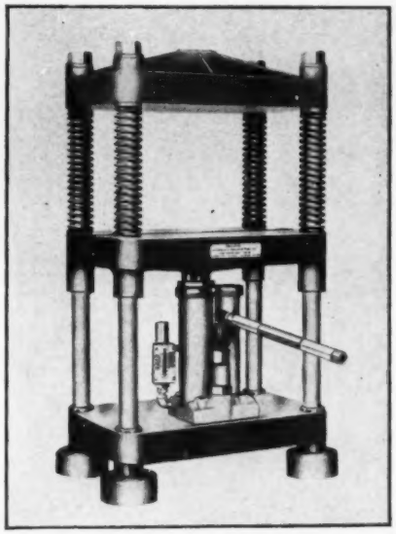


STRAIGHTENING PRESS—*Lake Erie Engineering Corp., Buffalo, N. Y.* Features of this line of heavy-duty hydraulic straightening presses are a C-frame for convenient handling of long bars, and fast operation. Vol. 85, p. 674.



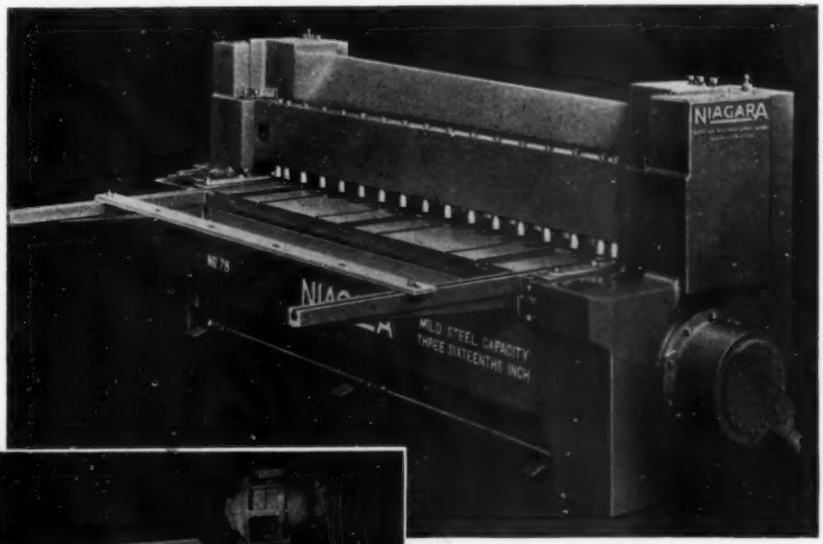
DIE DUPLICATING SHEAR—*O'Neil-Irwin Mfg. Co.,* 316 *Eighth Ave., S., Minneapolis, Minn.* Steel plate as thick as 24-gage can be sheared with the No. 1 Micro die duplicating shear which now has material hold-down clamp and handle lock. Vol. 85, p. 1074.

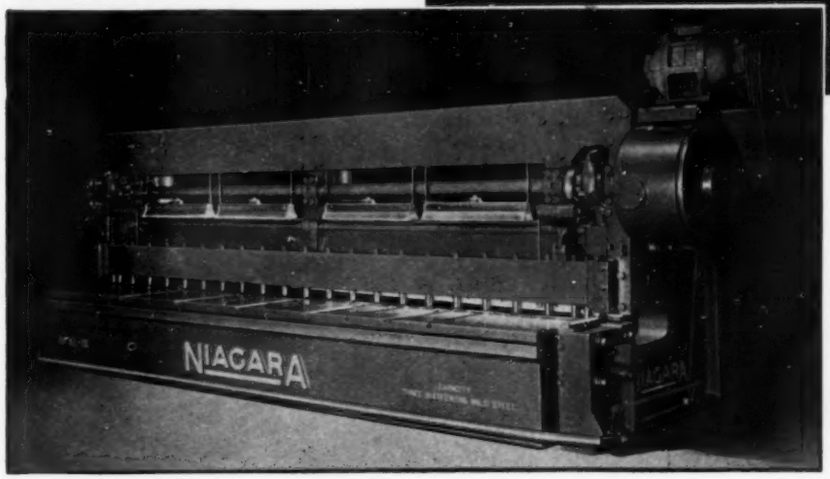




HYDRAULIC DRAW BENCH—*Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia, Pa.* This 340-ton horizontal hydraulic draw bench performs the second operation (drawing) on 12 to 15 in. shell. The first operation is carried out on vertical hydraulic piercing presses of approximately 1,500 tons capacity. Vol. 85, p. 409.

HYDRAULIC PRESS — *Pacific Hydraulic Press & Tool Co., P. O. Box* 87, *Huntington Park Sta., Los Angeles, Calif.* This leak-proof hand-operated hydraulic press is especially devised for shearing in punches and dies and is adaptable for experimental work on molds. Two sizes are available—the 15-ton model having 12×18-in. platens, and the 20-ton model having 18×24-in. platens. Vol. 85, p. 86.

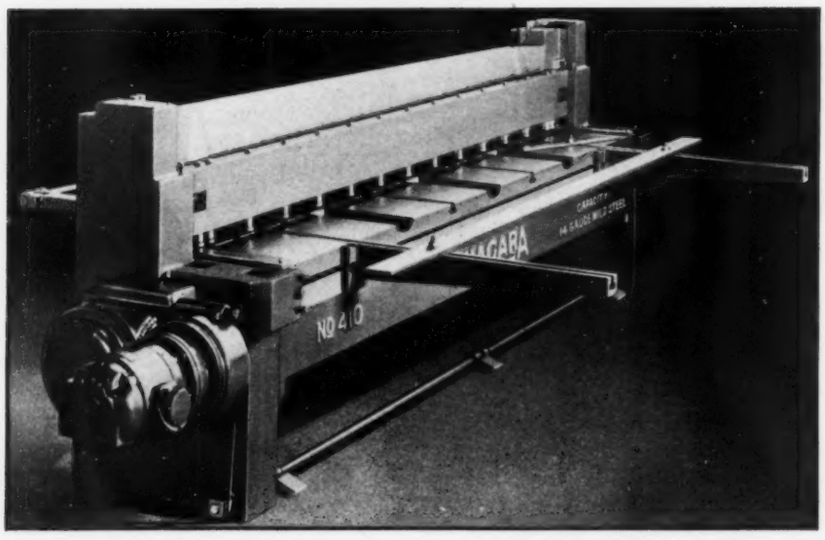




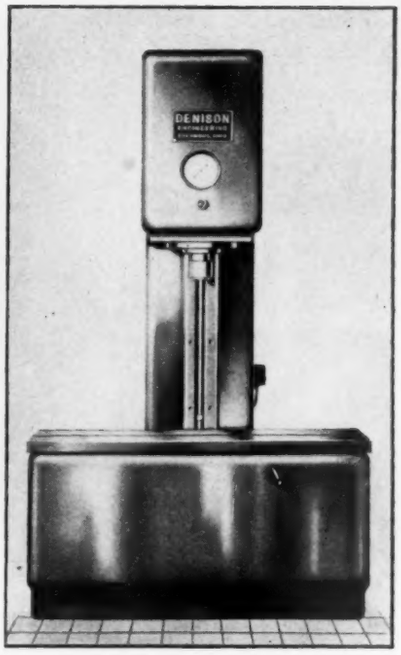
SHEARS—*Niagara Machine & Tool Works,* 637-697 *Northland Ave., Buffalo, N. Y.* Series 7 line of power squaring shears built in 4 to 12 ft. cutting lengths with capacities from ¼ in. to 10 gage, can be operated at a speed of 60 strokes per minute with convenient, safe handling of stock. Vol. 85, p. 1174.

SQUARING SHEAR—*Niagara Machine & Tool Works,* 637-697 *Northland Ave., Buffalo, N. Y.* Plates up to 18 ft. long and 3/16 in. thick can be cut readily with the Model KL-18 power squaring shear, equipped with quick setting self-measuring ball bearing parallel back gage adjustable in increments of 1/128 in. Built-in fluorescent lights illuminate working surface of the bed and throw a shadow at cutting line. Vol. 85, p. 131.

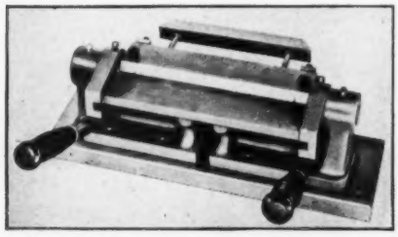
PRESSES, FORGING and MOLDING MACHINES



POWER SQUARING SHEARS—*Niagara Machine & Tool Works, 637–697 Northland Ave., Buffalo, N. Y.* With the Series 4 power squaring shear, metal sheets from 4 to 12 ft. in length and 12 to 16 gage can be cut into strips whose edges are straight within a few thousandths of an inch. Strips may be sheared at rate of 75 per min. Vol. 85, p. 997.



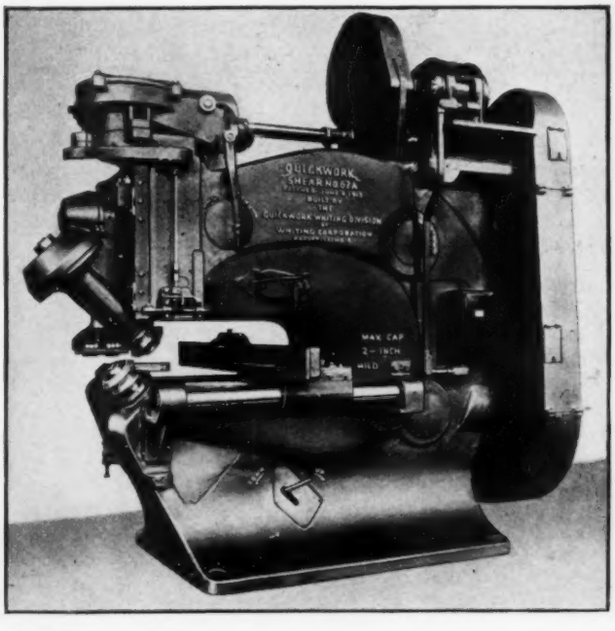
STRAIGHTENING PRESS — *Denison Engineering Co., 236 N. Water St., Columbus, Ohio.* Type DLSC2 hydraulic straightening press is available in capacities of 25 or 50 tons. The press is adapted to a wide range of production straightening. Vol. 85, p. 88.

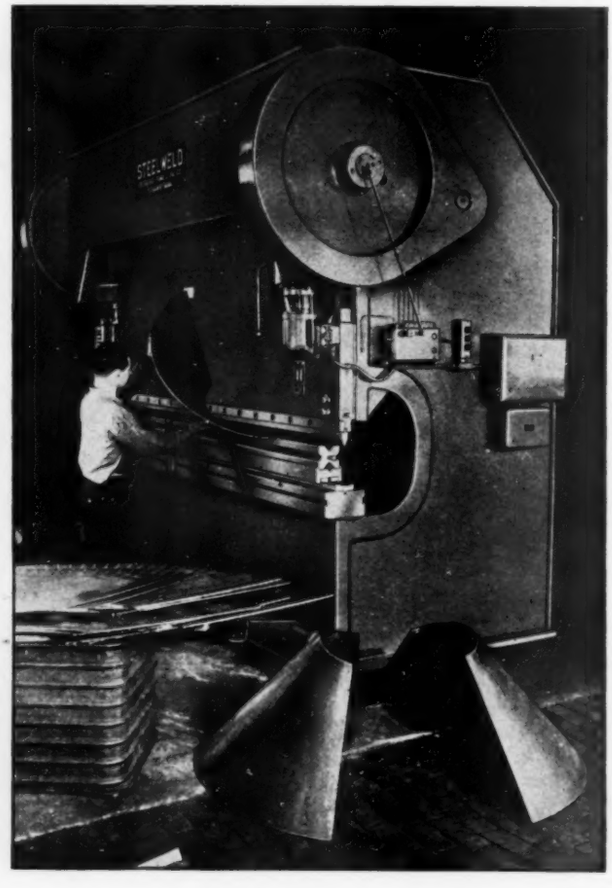


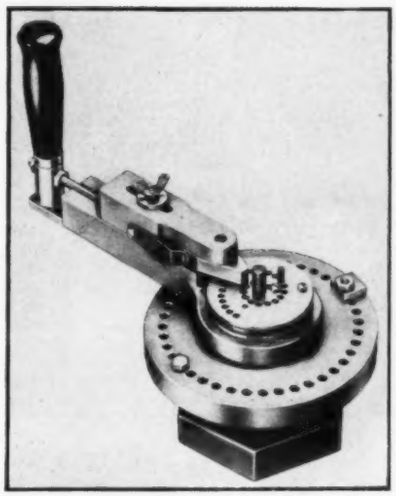
DUPLICATING BRAKE—*O'Neil-Irwin Mfg. Co., 316 Eighth Ave., S., Minneapolis, Minn.* Designed for working material used in aircraft, communication, electrical and instrument manufacture, the No. 2 Micro Die duplicating brake has a maximum width capacity of 8 in. Maximum folding capacity full width is 14-gage steel plate using handles at both ends simultaneously, 18-gage steel plate when using right or left hand handle only. Vol. 85, p. 680.

PRESS BRAKE—*Steelweld Machinery Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.* Conical sections can be made without special dies by a tapering mechanism now supplied on press brakes. Either end can be tapered as much as ¼ in. per foot of bed length. Vol. 85, p. 996.

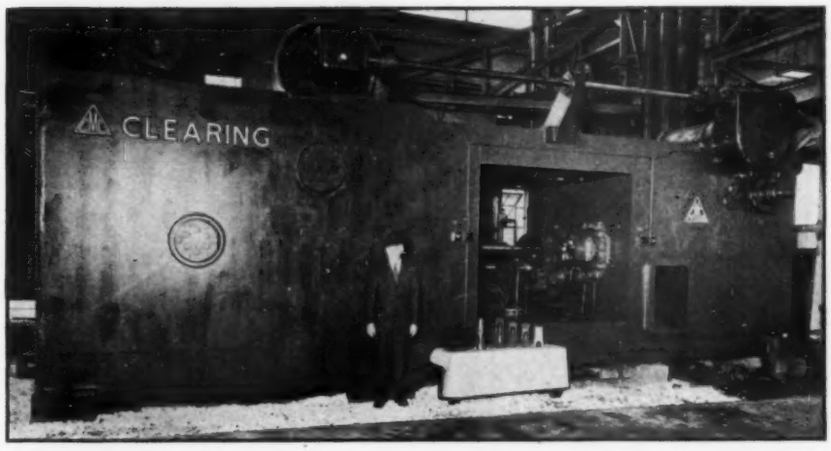
ROTARY SHEAR—*Quickwork-Whiting Div., Whiting Corp., Harvey, Ill.* Mild steel plates up to 2-in. thick, having a tensile strength of 65,000 lb. per sq. in., and 1-in. plates with a tensile strength of 130,000 lb. per sq. in., can be sheared at speeds up to 50 ft. per min. with the Model No. 62-A "Quickwork" rotary shear. Vol. 85, p. 89.



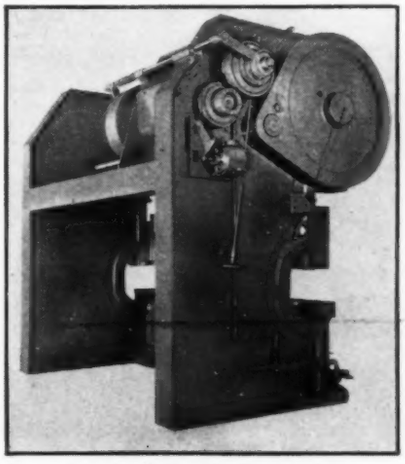




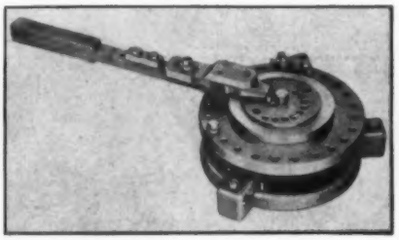
DIE DUPLICATING BENDER — *O'Neil-Irwin Mfg. Co., 316 Eighth Ave., S., Minneapolis, Minn.* Two-way operation, either right or left hand, of the No. 1 Micro die duplicating bender prevents most material ends from interfering when forming intricate shapes and contours. Vol. 85, p. 1070.



SHELL FORGING MACHINE—*Clearing Machine Corp., 6499 W. 65th St., Chicago, Ill.* This automatic shell forging machine, eliminates all manual handling from the time the hot billet is placed in the de-scaler until the finished forging is placed on a cooling conveyor. It will produce from 240 to 300 finished 90-mm. shell forgings per hour. Vol. 85, p. 1068.



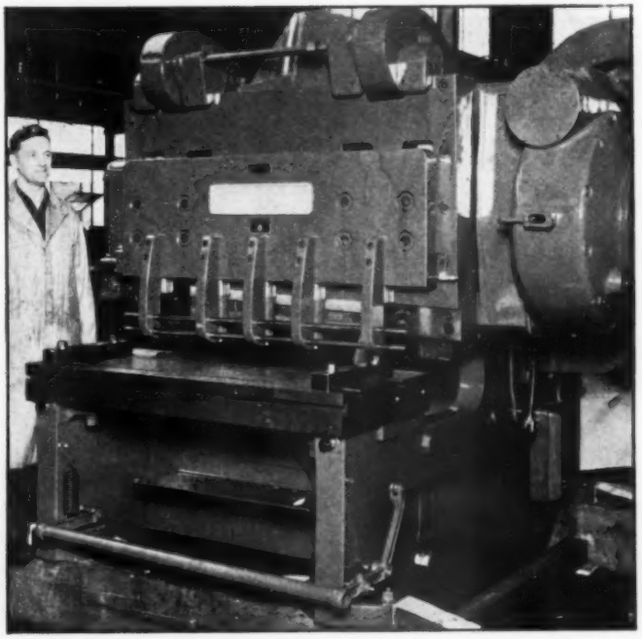
ELECTRICALLY - OPERATED CLUTCH—*Steelweld Machinery Division, The Cleveland Crane & Engineering Co., Wickliffe, Ohio.* The electrically-operated clutch and brake mechanism developed for bending presses is set in operation by depressing the foot pedal which actuates the switch and brings the torque motor into play. Although all Steelweld bending presses can be furnished with this mechanism, it is particularly desirable for larger machines used for forming plate of ½ to 1 in. and greater in thickness. Vol. 85, p. 1345.

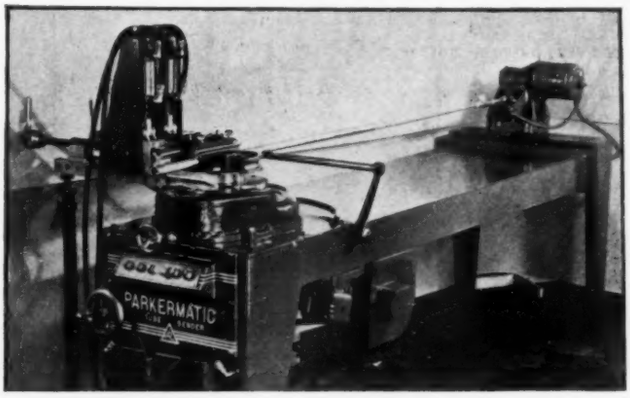


STRIP BENDER—*O'Neil-Irwin Mfg. Co., 316 Eighth Ave., S., Minneapolis, Minn.* The No. 2 "Micro" die duplicating bender is capable of handling larger sizes of strip than previous models. It is suitable for forming stainless steel tubing, and also is satisfactory for forming heavy busbars such as used in electrical power transmission, bending the material both on edge and vertically. Vol. 85, p. 515.

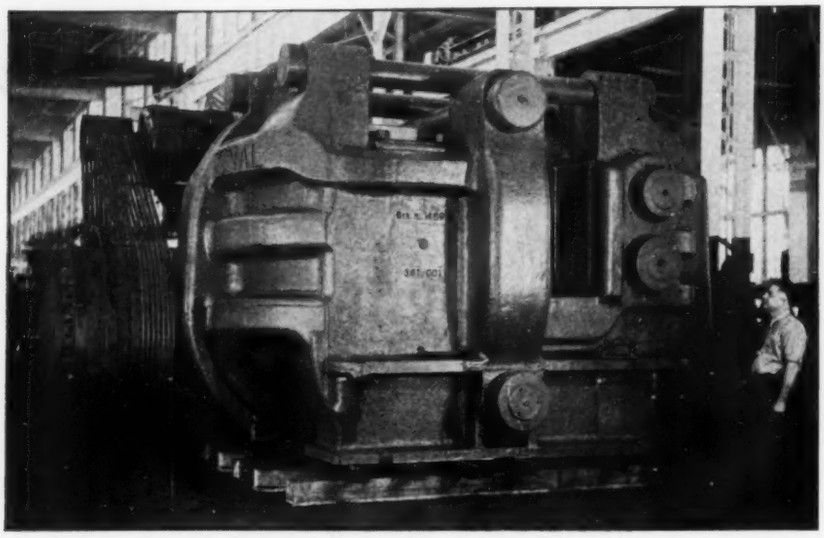
ROLLING MILL SHEAR—*Cincinnati Shaper Co., Cincinnati, Ohio.* With a speed of 30 strokes per minute, this small 4 ft. by 1 in., No. 6204 rolling mill shear is rugged and dependable. It was built to cut brass and zinc. Vol. 85, p. 827.

TUBE BENDER—*Parker Appliance Co., Cleveland, Ohio.* Automatic bending and return cycles are employed in the "Parkermatic" power-driven bending machine. While primarily designed for bending 3-in. outside diameter copper, aluminum alloy, and 2½-in. outside diameter annealed steel tubing, it can also bend steel shapes. Vol. 85, p. 316.

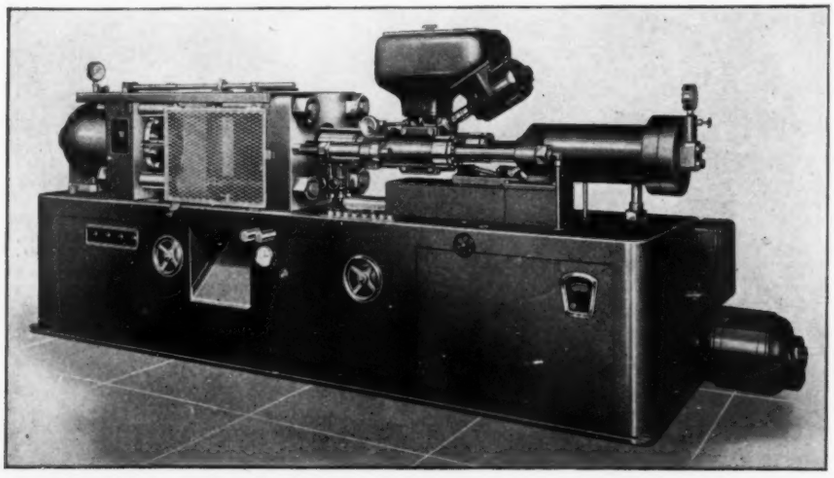




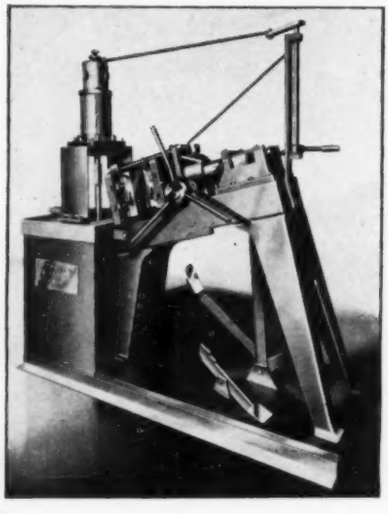
PRESSES, FORGING and MOLDING MACHINES



FORGING MACHINE—*National Machinery Co., Tiffin, Ohio.* With a total weight of approximately 500,000 lb., this 9-in. capacity high-speed precision forging machine features extremely compact design to assure utmost rigidity. It has been built for the production of accurate forgings in sizes larger than previously possible. Vol. 85, p. 359.

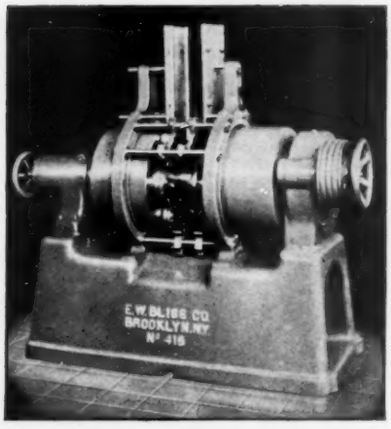


INJECTION MOLDING PRESS—*Hydraulic Press Mfg. Co., Mount Gilead, Ohio.* This 12-oz. single-nozzle injection molding press is designed for molding of large parts where multiple injection molding is not required. Clamp pressure, 200 tons; maximum mold size, 16½×24 in.; pressure in injection chamber, 30,000 lb. per sq. in. Vol. 85, p. 362.

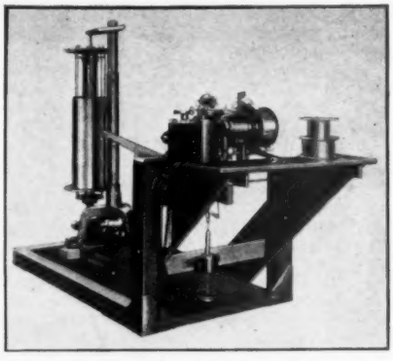


MOLDING PRESSES—*Plastics Div., F. J. Stokes Machine Co., 5930 Tabor Rd., Philadelphia, Pa.* Automatic in operation, except for the actual loading and removal of finished pieces, the "Standard" semi-automatic molding presses have a slow closing control feature by means of which the final closing of the mold under compression may be accurately timed for 1 sec. to 20 min. Vol. 85, p. 360.

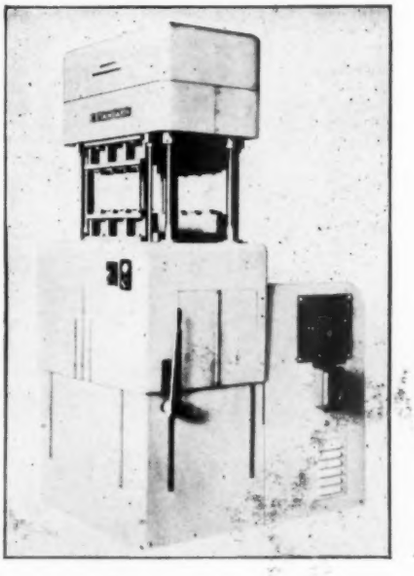
DIECASTER — *Burroughs-Kahn Co., 1239 South Bend Ave., South Bend, Ind.* Small castings that do not require exceptional finish can be run as high as 350 to 400 "shots" per hour on the Model 200 diecaster. For relatively simple castings, universal die mounting blocks can be arranged for further simplification. Vol. 85, p. 1290.

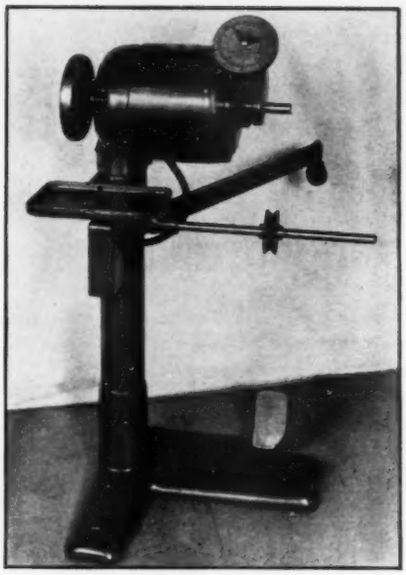


CAN FLANGER—*E. W. Bliss Co., 53rd St. and Second Ave., Brooklyn, N. Y.* No. 416 can body flanger handles cans with diameters from 4 to 6⅝ in. and heights from 2 to 12 in. Vol. 85, p. 406.

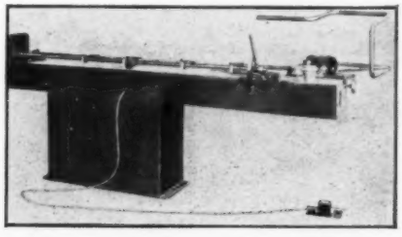


SPOOL WINDER—*General Engineering & Mfg. Corp., 35 Verona Ave., Newark, N. J.* The finest gages of bare or cotton covered wire can be handled with this automatic spool winder. Machine may be arranged to maintain constant wire speed with consequent variation in spool spindle speed, or for constant spool spindle speed with the necessary varying wire speed. Vol. 85, p. 86.

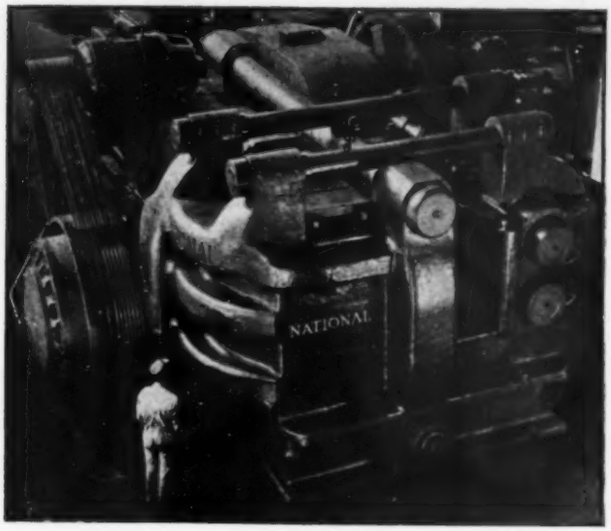




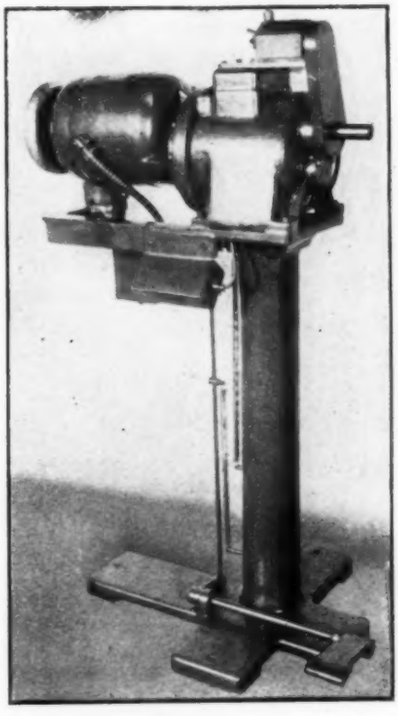
COIL WINDER—*Globe Tool & Engineering Co., 436 Davis Ave., Dayton, Ohio.* A simple fiber guide block on the No. 2 universal coil winder permits accurate leveling of wire on the winding spindle at speeds up to 4,000 r.p.m. It winds coils of No. 25 to No. 40 copper wire or equivalent. Speed is adjustable up to 6,000 r.p.m. Vol. 85, p. 1168.

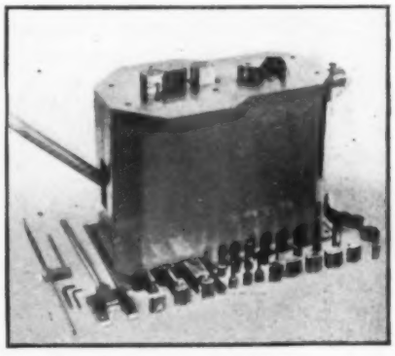


TUBE BENDER—*Pines Engineering Co., 123 Main St., Batavia, Ill.* Series 200 air-operated tube bender, capable of producing an average of 250 bends per hour on 1-in., single gage tube, has a capacity of ⅜ to 1½ in. soft annealed copper or aluminum tubing, and ⅜ to 1 in., 16-gage soft steel tubing. Vol. 85, p. 1294.



FORGING MACHINE—*National Machinery Co., Tiffin, Ohio.* The compactness of this giant forging machine provides maximum stiffness and rigidity essential for accurate manufacture of forgings. Air-cooled friction clutch permits quick starting at high speed. Vol. 85, p. 1242.





MULTIFORM MACHINE—*J. A. Richards Co., Kalamazoo, Mich.* Steel plate 2 in. high and ⅛ in. thick can be bent with the Multiform machine. Built particularly for producing dies, it can be used for forming flat stock. Vol. 85, p. 1070.

COIL WINDER—*Globe & Tool Engineering Co., Dayton, Ohio.* Wire sizes from No. 40 to No. 8 can be wound into coils as large as 8 in. in diameter and 8 in. in length on this two-speed coil winder. Counter registers up to 10,000 turns, can be set to stop on any desired number of turns. Vol. 85, p. 1068.

THE DIRECT-ACTING AIR CLUTCH

Universally accepted throughout the forging industry as the ideal clutch for high production forging equipment

Today, after 10 years of outstandingly successful performance on various types of heavy, high-production forging machinery, the Ajax Direct-acting Air Clutch is still unchallenged in ease and speed of operation, dependability and durability by other types of mechanical stop-motion mechanisms.

The instantaneous starting of the direct-acting air clutch on Ajax Forging Machines has resulted in as much as 25% increase in output on certain forging jobs, while its smooth cushioned engagement at high operating speeds has reduced down-time and over-all machine maintenance to a minimum. The double draft ventilation, a recent Ajax innovation which provides ample cooling to dissipate the heat, has immeasurably prolonged the life of the friction surfaces and removed all restrictions from high frequency of operation.

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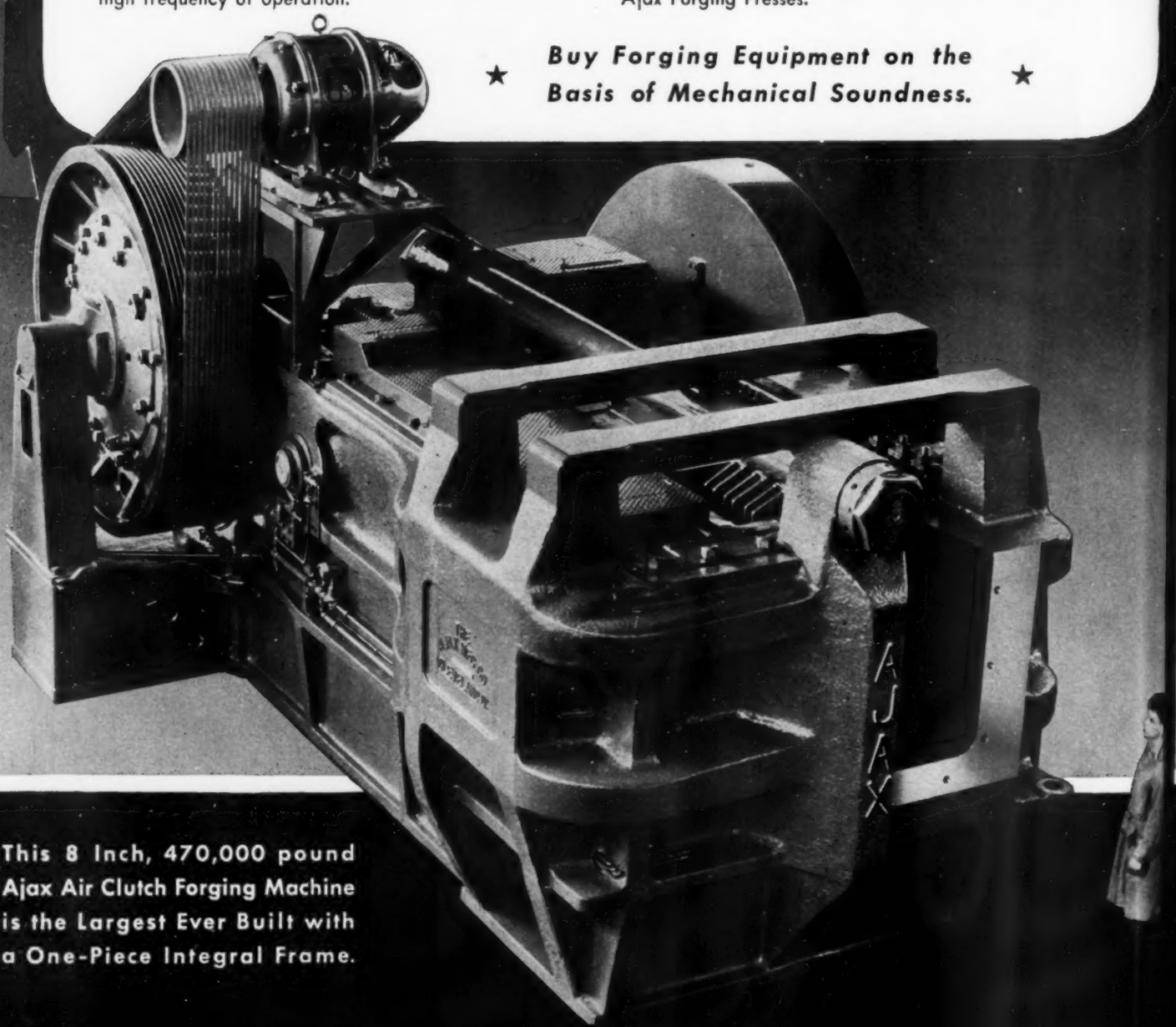
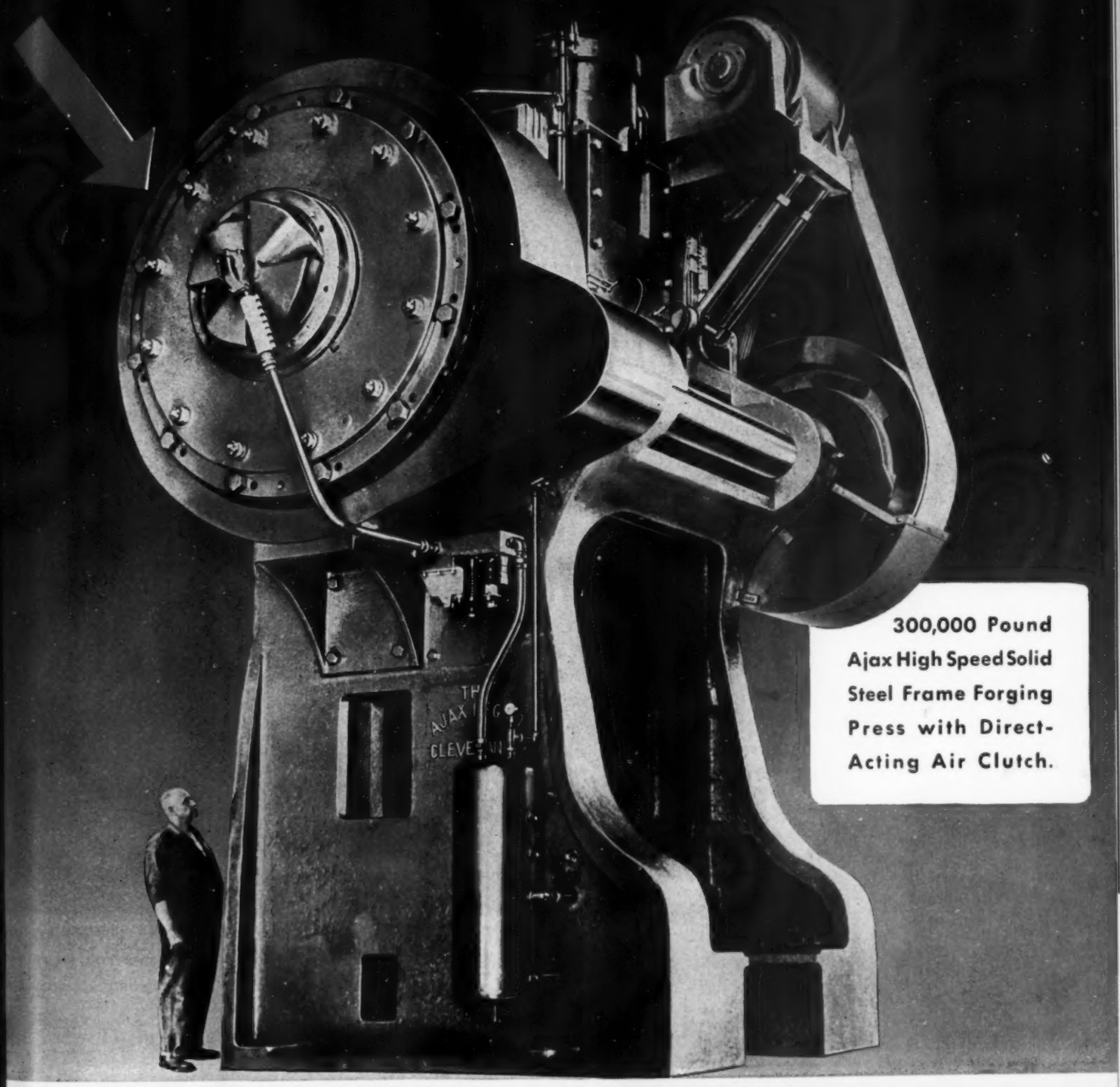
The superior ease of operation, speedier production, greater dependability and durability afforded by Ajax Air Clutch Forging Machinery re-emphasizes the wisdom of buying forging equipment purely on the basis of mechanical soundness. Write for new Bulletin 65-B on Ajax Air Clutch Forging Machines or Bulletin 75 on Ajax Forging Presses.

★ ***Buy Forging Equipment on the Basis of Mechanical Soundness.*** ★



This 8 Inch, 470,000 pound Ajax Air Clutch Forging Machine is the Largest Ever Built with a One-Piece Integral Frame.

Introduced by Ajax in January 1932–
Proved by 10 years gruelling service



300,000 Pound Ajax High Speed Solid Steel Frame Forging Press with Direct-Acting Air Clutch.

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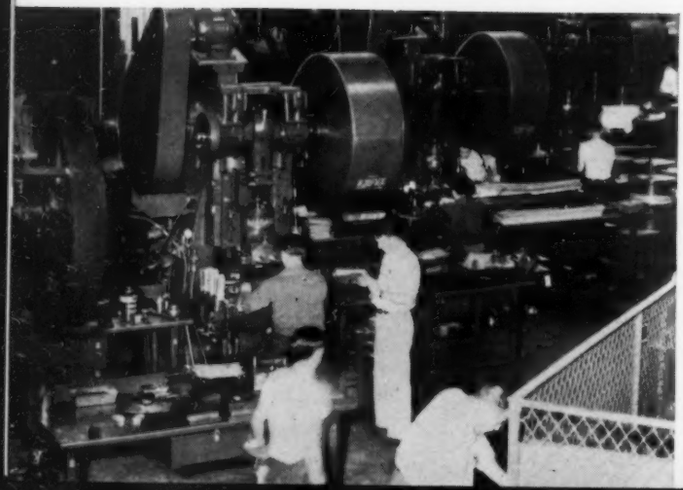
IN DEFENSE PLANTS

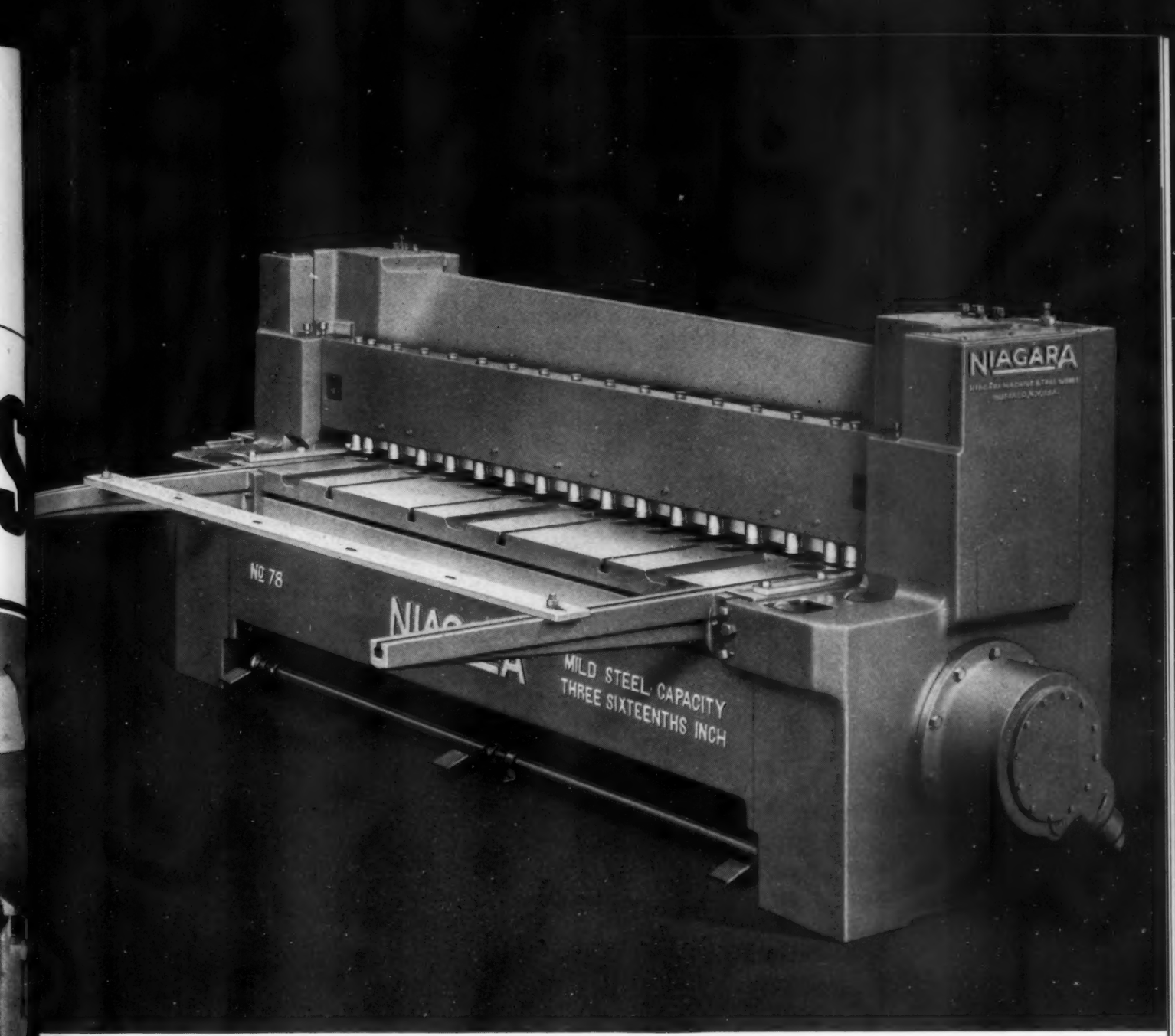
PRODUCTION SPEEDS UP WITH NIAGARA PRESSES



Manufacturers of airplanes, trucks, tanks and many oth types of fighting equipment are speeding up productio with Niagara Presses.

★

View of part of the press room in one of America defense plants where Niagara Presses are workin 24 hours a day and seven days a week.



MORE PRODUCTION *with* NIAGARA SHEARS

Latest type Niagara Power Squaring Shears are being widely used to increase production in leading defense plants.

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BUFFALO, N. Y.

Branches: New York Cleveland Detroit

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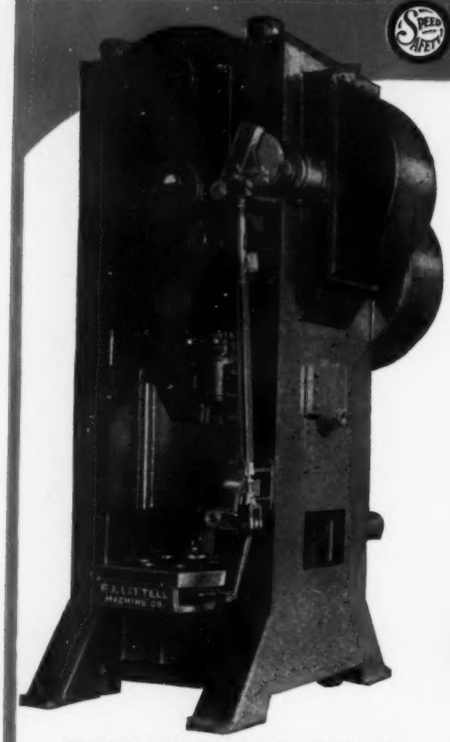
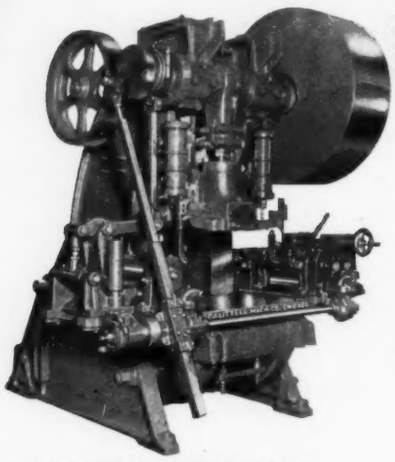
LITTELL *for Faster Defense Production*

Top speed in National Defense production can be secured with Littell Roll and Dial Feeds, used by leading concerns for increasing output 200 to 300 percent.

Littell pressroom equipment includes—Reels for coil stock, Roll and Dial Feeds, and Feeding and Straightening Machines. REQUEST BULLETINS.

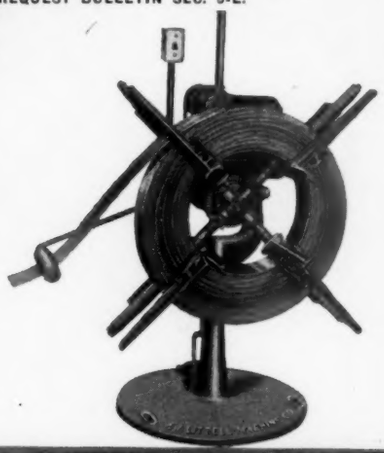


Littell Dial Feed, mounted on large straight-sided press, for producing cartridge cases. Dial Feeds of this type, used in cartridge case manufacture, performs the following operations: 1st, 2nd and 3rd draw, heading and indenting, piercing and tapering.
REQUEST BULLETIN SEC. 31.



No. 6-12½ Littell Double-Rack and Pinion Roll Feed with Power-Driven Straightener and Scrap Cutter, for blanking and drawing small shells. Mounted on large open-back inclinable press. Feed length, 0 to 15". Feed rolls, 6¼" dia. x 12½" long.
REQUEST BULLETIN NO. 1-B.

No. 3-G Littell Patented Motor-Driven Automatic Centering Reel and Scrap Winder, for unreeling material to automatic presses. Capacity, 300 lbs., 6½" wide.
REQUEST BULLETIN SEC. 5-E.



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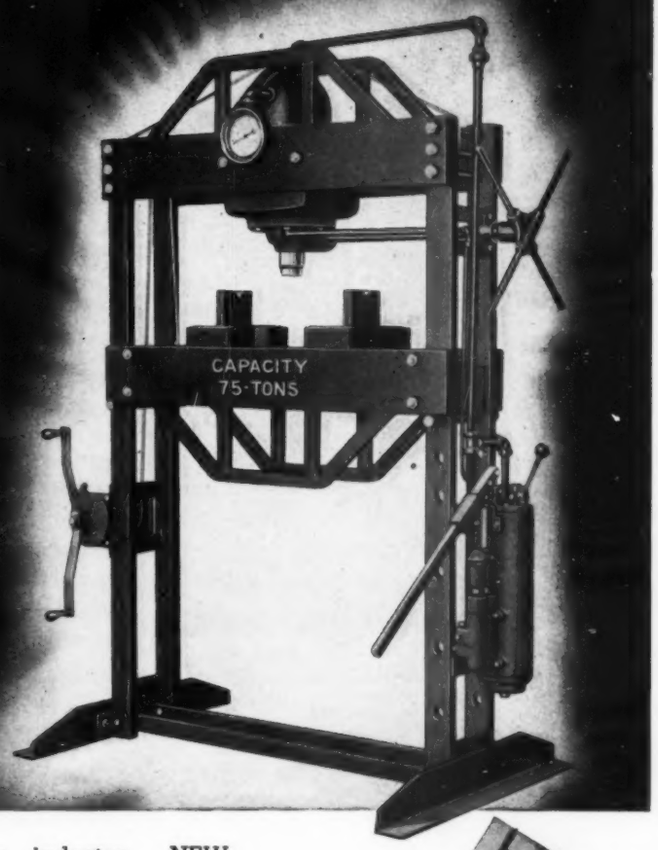

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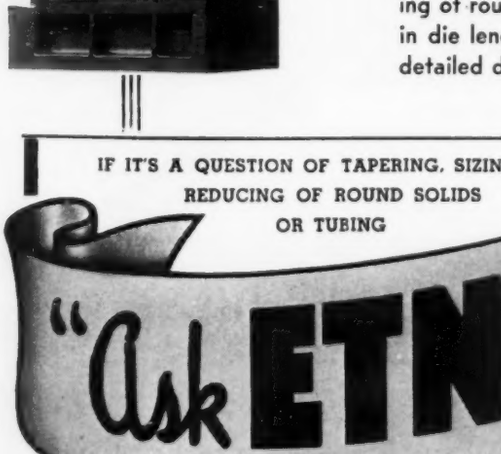
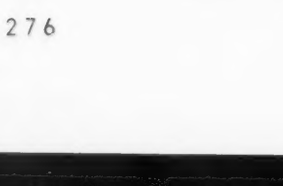
. . . such as that shown in the operation pictured here . . . the swaging of tubing preparatory to drawing. This activity falls within the normal work range of ETNA Swaging Machines—tapering, sizing or reducing of round solids or tubing, and the swaging of tubular assemblies. On operations such as these, ETNAS have established a reputation for cost reducing, volume increasing output . . . have built an enviable record for solving varied mass production problems. When the national preparedness program swung into high gear, ETNAS were chosen in many plants to do their part. They . . .



★ • • • have brought speed and economy to many phases of production for defense.

. . . like the direct munitions operations shown here . . . the swaging of a narrow copper band around a 20 m.m. shell. Two No. 72 ETNAS are performing this task in the plant of a prominent mid-western manufacturer. Production is 900 per hour on each unit . . . tangible evidence of what can be expected of an ETNA installation in *your* plant, doing your work. But defense is no longer a preparatory activity, but an actuality. These and other units . . .



★ • • • are now doing their part in further stepping up WAR output so as to assure final victory!

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This link for Vickers type machine gun is produced complete one per stroke, 140 per minute.

H&W DIEING MACHINES MAKE MOST OF THE MACHINE GUN BELT LINKS

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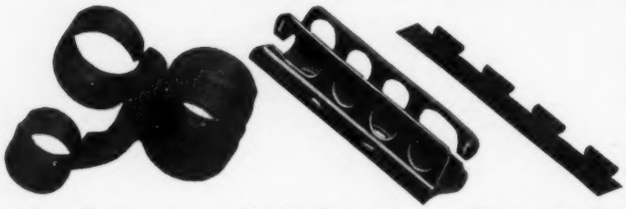

Another of the numerous machine gun belt links produced from flat material complete per stroke to precision limits.

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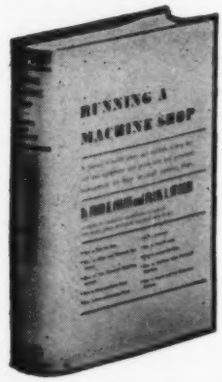

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- —conveyors in the job shop
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- —making the tool crib pay
- —allocating machine hours
- —shortening work travel
- —estimating on contract work
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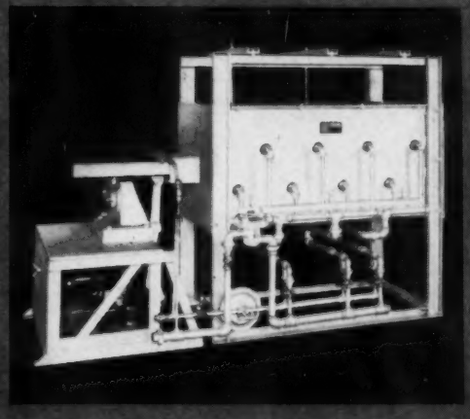

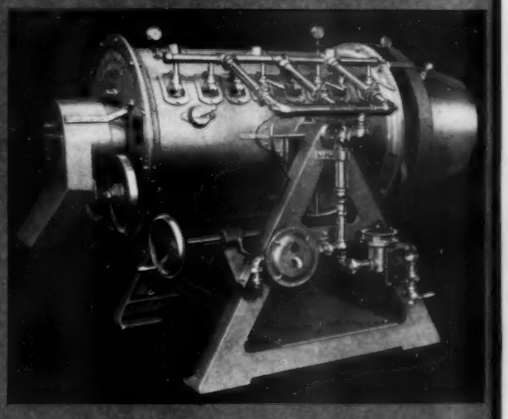

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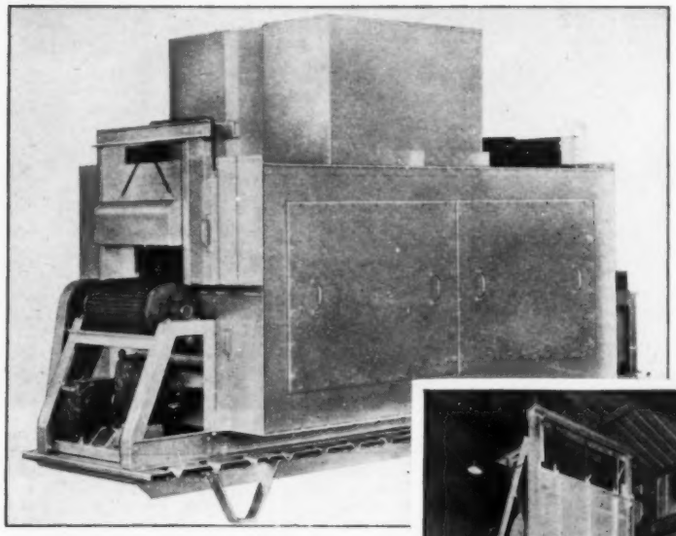
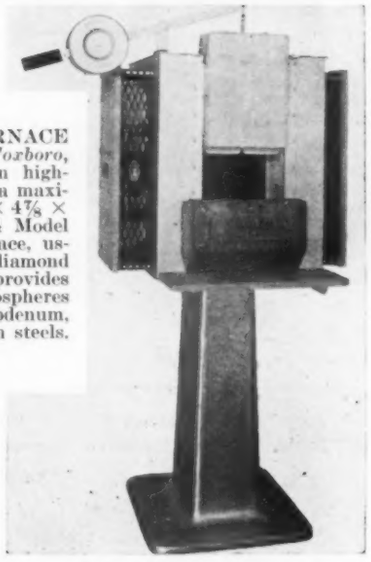
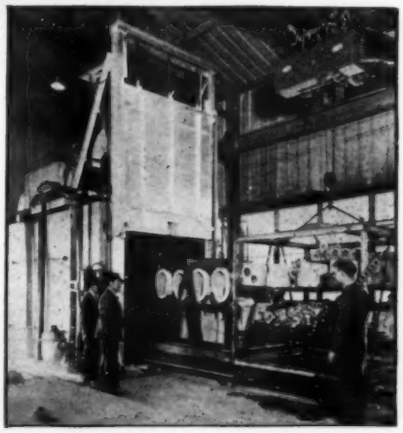


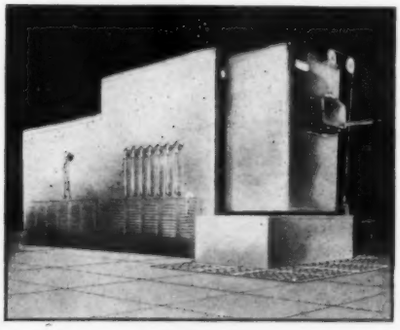
CONVEYOR-TYPE FURNACE — *The Gehnrich Corp., 42-03 35th St., Long Island City, N. Y.* This conveyor-type, convection-heated furnace for pre-heating, drawing, normalizing, annealing and stress relieving provides temperatures up to 1,250 F. Vol. 85, p. 1242.



ELECTRIC FURNACE —*Sentry Co., Foxboro, Mass.* To harden high-speed tools up to a maximum size of $4\frac{3}{4} \times 4\frac{7}{8} \times 11$ in., the Size 4 Model "Y" electric furnace, using the Sentry diamond block method, provides controlled atmospheres suitable for molybdenum, cobalt, or tungsten steels. Vol. 85, p. 1015.



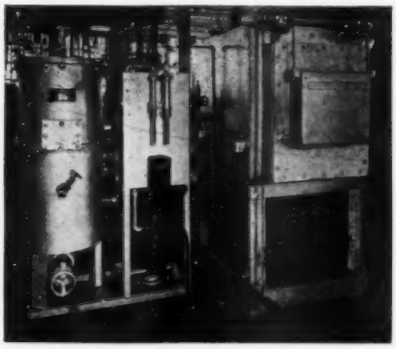
CAR-BOTTOM FURNACE — *Despatch Oven Co., Minneapolis, Minn.* Rapid installation and dependable performance are features of this heat-treating furnace recommended for tempering and drawing alloy steel, normalizing and stress-relieving of castings and welded sections, and numerous other heat-treating processes requiring a temperature range up to 1,200 F. Vol. 85, p. 891.



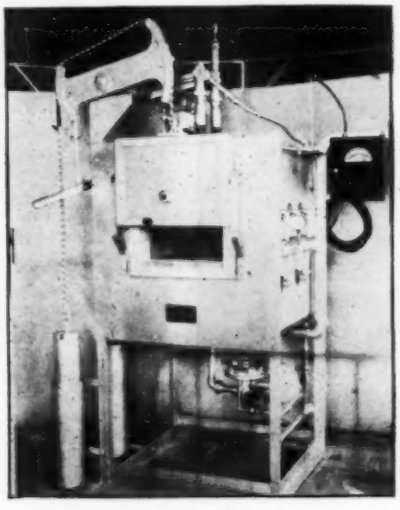
CARBURIZING FURNACE—*The Lithium Corp., Raymond-Commerce Bldg., Newark, N. J.* The Lithcarb atmosphere furnace, using Lithco compound, completely neutralizes scaling and decarburizing reactions, and provides fast, bright, gas-carburizing without scale, soot or tar formations. Vol. 85, p. 834.

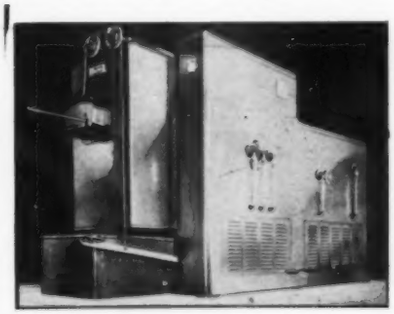
BELL-OVEN FURNACE — *American Gas Furnace Co., Elizabeth, N. J.* The demand for a small unit for heat-treating with definite atmosphere control is met by the "Bell-Oven" furnace which can be used with various atmospheres for clean hardening, carburizing, nitriding and "Ni-Carbing." Vol. 85, p. 364.

BOX-TYPE FURNACE — *Despatch Oven Co., Minneapolis, Minn.* CF furnaces are adaptable to toolroom tempering and drawing work, to the heat-treatment of aluminum rivets and other aluminum alloy castings and parts, to the preheating of aluminum billets before forging, to the heat-treatment of magnesium alloy castings. Vol. 85, p. 566.



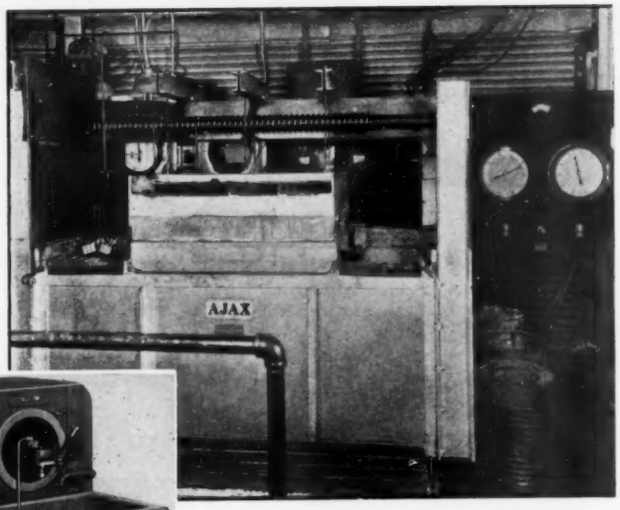
BOX-TYPE FURNACE—*General Electric Co., Schenectady, N. Y.* Box-type furnaces are available for heat-treating tools and small steel parts without scale or decarburization at temperatures up to 2,000 F. Vol. 85, p. 728.





ATMOSPHERE FURNACE — *Lithium Corp., Raymond-Commerce Bldg., Newark, N. J.* Steels of different carbon analyses can be heated simultaneously without changes in surface carbon content with the Model HU812-4 "Lithco" atmosphere furnace. Vol. 85, p. 456.

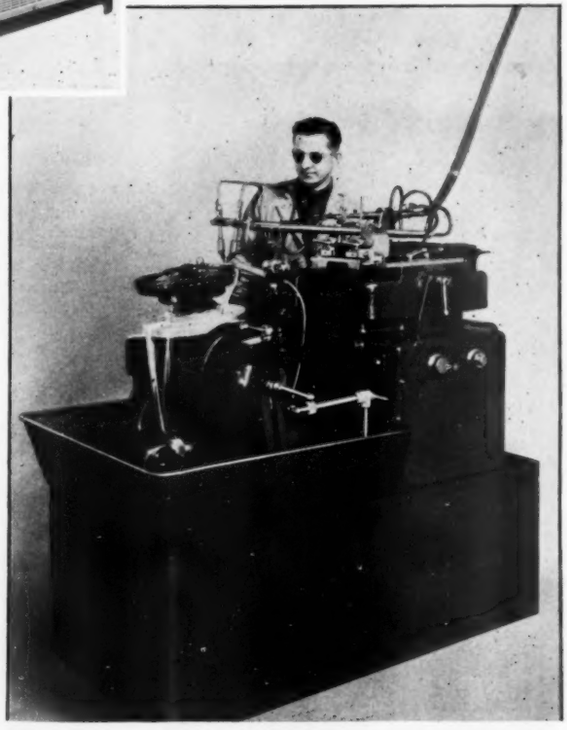
FURNACES — *Johnson Gas Appliance Co., 520 East Ave., Cedar Rapids, Iowa.* The No. 130 "Hi-Speed" heat-treating furnace produces a temperature of 2,300 F. in 22 min. There is also a No. 570 pot-hardening and metal melting furnace. Vol. 85, p. 203.



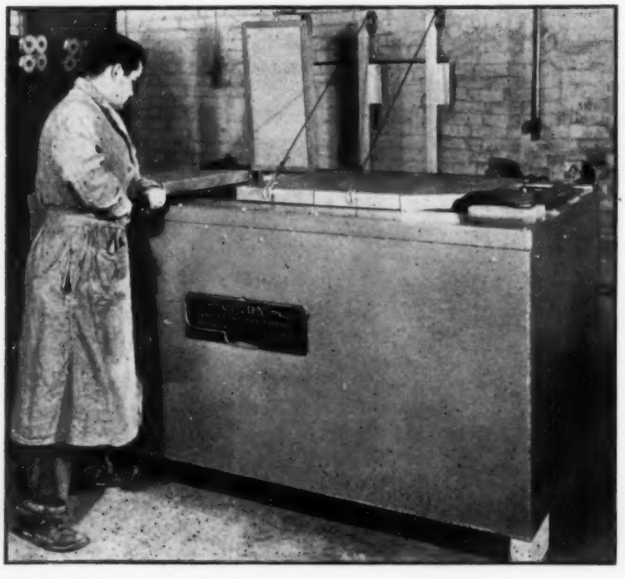
SALT BATH FURNACE—*Ajax Electric Co., Frankford Ave. and Allen St., Philadelphia, Pa.* Temperatures from 300 to 2,400 F. are maintained virtually constant for the duration of the heat-treating period in this completely conveyorized electric salt bath furnace for case hardening, simultaneous brazing and carburizing, tempering, annealing, brazing, and heating for forging. Vol. 85, p. 900.

PIT-TYPE FURNACE—*The Sentry Co., Foxboro, Mass.* This controlled-atmosphere pit-type furnace for high-temperature hardening of high-speed steel allows the hardening of long tools in a vertical position and eliminates any tendency of the tools to warp or change shape when hot. Vol. 85, p. 513.

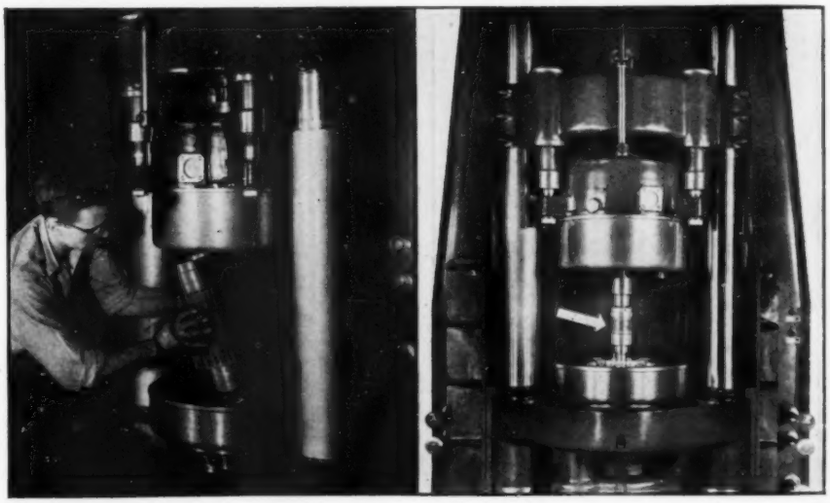
TWO-STATION INDUCTION HARDENER—*Ohio Crankshaft Co., 6600 Clement Ave., Cleveland, Ohio.* Doubling the production capacity of the original one-station, 20-kw. "Tocco" Junior induction unit, the two-station machine is operated by one worker. This unit also is easily adapted for brazing, heating for forging, stress relieving and soldering. Vol. 85, p. 1015.



AUTOMATIC FLAME HARDENER—*Gleason Works, 1000 University Ave., Rochester, N. Y.* Advantages of oxy-acetylene flame hardening are exteaded to medium and small-size bevel, spur and internal gears, sprockets and the like, with this automatic surface hardening machine. Both sides of the tooth are hardened simultaneously without distortion and in the same length of time and to the same depth as every other tooth. Vol. 85, p. 727.

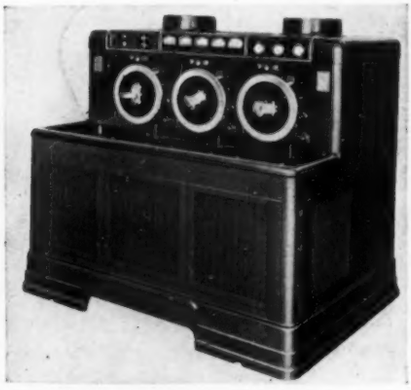


SALT BATH FURNACE—*Upton Electric Furnace Co., 2211 Grand River, Detroit, Mich.* Based on an "Electrothermic-Permeation" principle, an improved type of internally heated electric salt bath furnace capable of producing more uniform heat, reducing fuel costs, and eliminating excessive spoilage of carburizing salts has been developed. Range of temperatures is 300 to 2,500 F. Vol. 85, p. 454.



INDUCTION HEAT-TREATING — *Budd Induction Heating, Inc., subsidiary of Budd Wheel Co., Detroit, Mich.* With this process of hardening internal bore surfaces, such parts as cylinder liners and wheel hubs can be heat-treated under precise control, achieving an extremely hard surface while the remainder of the part retains its original toughness. Other advantages include longer life, greatly improved physical properties, high-speed operation and the possibility of simplified product design. Vol. 85, p. 508.

THERMONIC INDUCTION HEATING—*Induction Heating Corp.,* 791 *Broadway, New York, N. Y.* In Thermonic induction heating generators for surface hardening, brazing, melting, heat-treating, annealing and forging ferrous and non-ferrous parts current with a frequency as high as 500,000 cycles is transmitted. Vol. 85, p. 1014.



INDUCTION FURNACES—*Ajax Electrothermic Corp., Trenton, N. J.* The de-scaling process has been eliminated and expensive nosing dies last longer when these high frequency furnaces heat shell ends for nosing. Vol. 85, p. 1015.

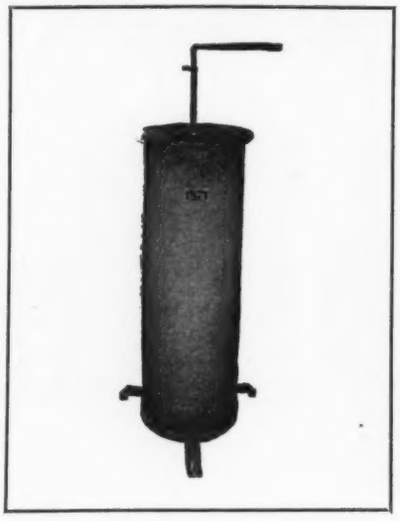
ELECTRIC BRAZER—*Ideal Commutator Dresser Co.,* 1057 *Park Ave., Sycamore, Ill.* This electric brazer for brazing and soldering with silver solder, consisting of a pair of electric heating pliers and a power unit or transformer, operates on the same principle as the Ideal Termo-Grip self-soldering tool. Vol. 85, p. 784.

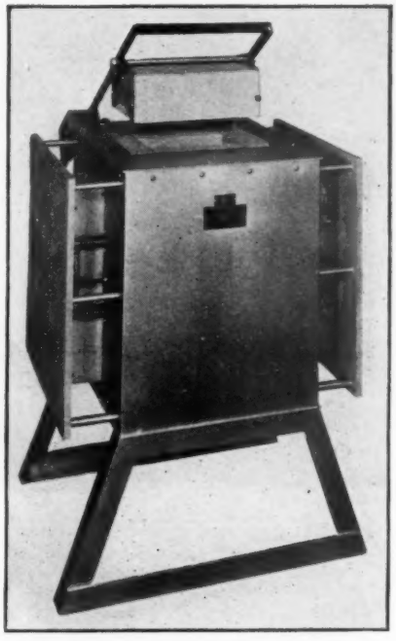
INDUCTION HARDENER — *Ohio Crankshaft Co.,* 6600 *Clement Ave., Cleveland, Ohio.* The three-station, 20-kw. "Tocco Jr." induction hardening machine comes in two models: one for applications not requiring quenching; the other for localized hardening. Vol. 85, p. 197.

AIR DRAWING OVEN—*Harold E. Trent Co., 55th and Wyalusing Ave., Philadelphia, Pa.* This air drawing oven, with an internal capacity 26 in. wide, 24 in. high, 24 in. deep can be used for temperatures to 600 F. Vol. 85, p. 1018.

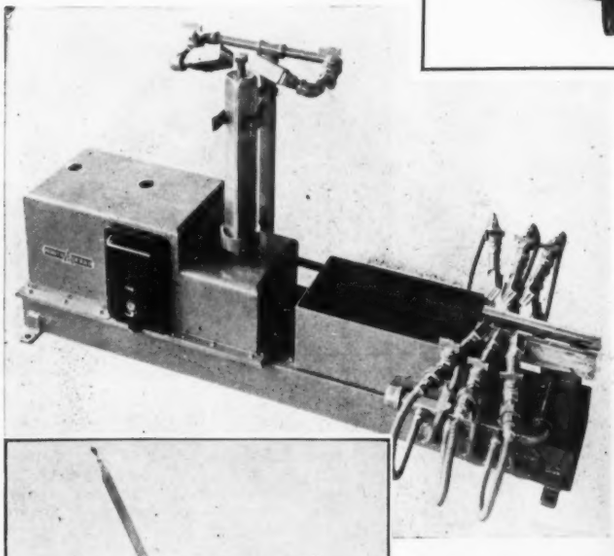
WELDING, HEAT-TREATING, CLEANING and FINISHING

CHECKING FURNACE—*Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa.* Available with heating elements for either a.c. or d.c. operation on 115 or 230 volts, thermocouples may be checked to greater accuracy over a wider temperature range in this redesigned checking furnace which requires an input ranging from 40 watts at 300 F. up to 1,000 watts at 1,800 F. Vol. 85, p. 415.



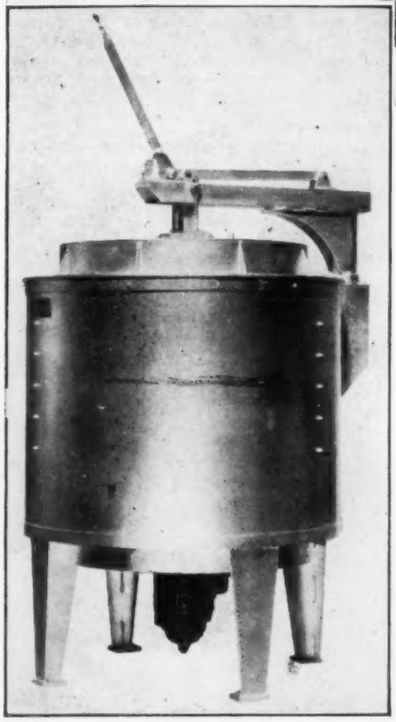


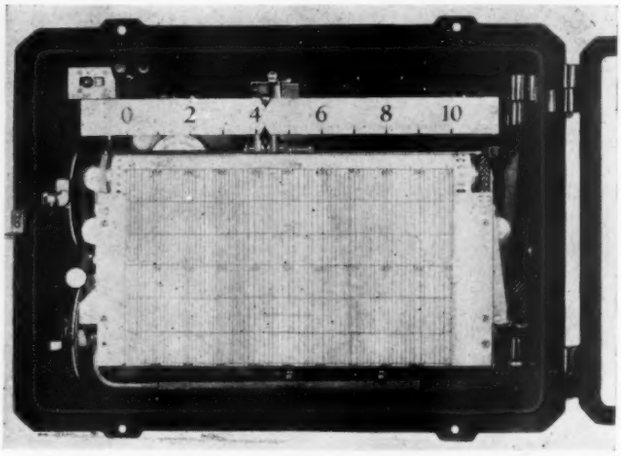
AUTOMATIC FLAME HARDENER—*Selas Co., Erie Ave. and D St., Philadelphia, Pa.* Complete flame-hardening machines, incorporating handling mechanism, time cycle control burner assemblies, quench tanks and combustion controllers semi-automatically flame harden spindle heads and latch forgings are available. Other units have been designed for valves, gears and saws. Vol. 85, p. 1014.



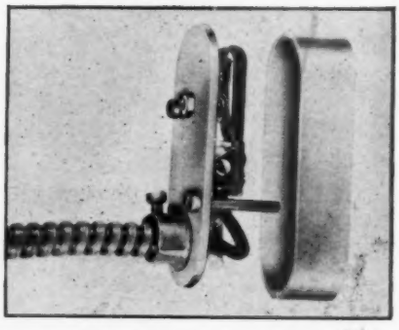
PIT-TYPE FURNACE — *The Sentry Co., Foxboro, Mass.* This small size pit-type controlled atmosphere furnace, designated as Size 2 of Model "YP", was designed to handle shorter tools. Height to opening 36 in., width 28⅜ in., and depth 21½ in. Vol. 85, p. 937.

PROPORTIONING CONTROL—*C. J. Tagliabue Mfg. Co., Park and Nostrand Aves., Brooklyn, N. Y.* Temperature over-shooting is prevented with the Celectray proportioning controller. This fuel heat throttler eliminates the relay detector element, formerly required. Vol. 85, p. 1017.



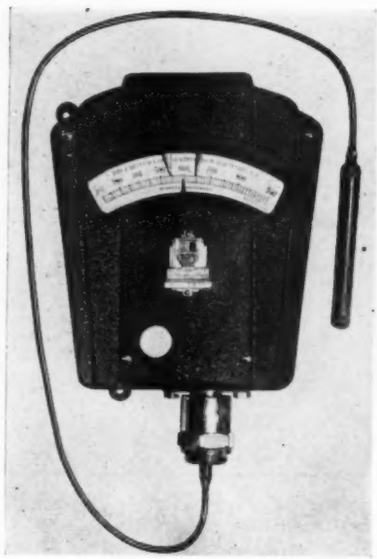


TIME-TEMPERATURE CONTROLLER — *Automatic Temperature Control Co., 34 E. Logan St., Philadelphia, Pa.* One adjustment regulates rate of increase or decrease in degrees per hour, another controls hours rate is to be maintained. Vol. 85, p. 1023.

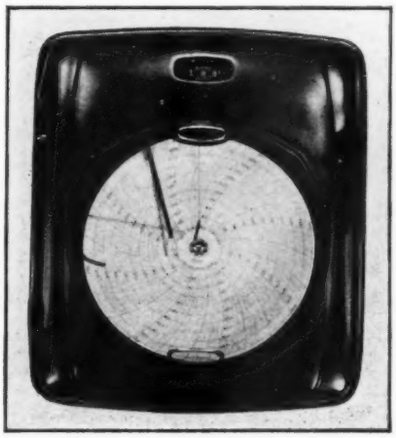


PIT-TYPE FURNACE — *Hevi Duty Electric Co., Milwaukee, Wis.* Pit type convection furnace used for all operations requiring temperatures up to 1,400 F. is suitable for handling small parts. Furnaces come in eight sizes with basket loading space ranging from 12 in. diameter by 6 in. depth to 28 in. diameter by 48 in. depth. Vol. 85, p. 1347.

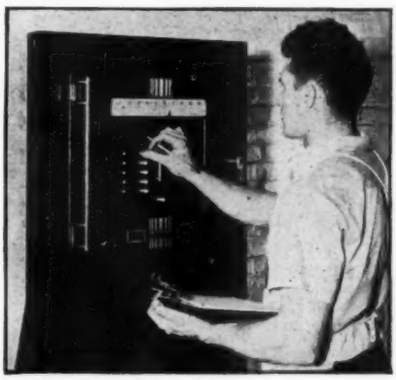
THERMOSTAT—*George Ulanet Co., 89 E. Kinney St., Newark, N. J.* Consisting of a thermostatic element mounted on a removable cover for greater accessibility, the "BX Strip" heavy-duty thermostat handles electric heater loads of 1,500 watts. Vol. 85, p. 138.



TEMPERATURE CONTROL—*Partlow Corp., 2 Campion Rd., New Hartford, N. Y.* Two independent themperature controls are incorporated in the Model B controller, which has a single thermal element and scale. Vol. 85, p. 1018.

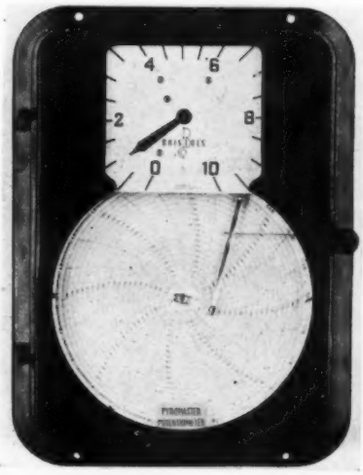


STABILOG CONTROLLER—*The Foxboro Co., Foxboro, Mass.* Closer control and greater convenience are featured in the Model 30 controller added to the Stabilog line. Vol. 85, p. 1166.

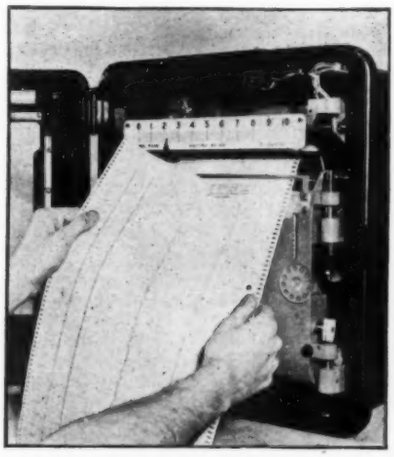


TEMPERATURE INDICATOR—*Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.* Direct measurements of thermocouple temperatures can be taken with Micromax Model S automatic indicator. Vol. 85, p. 1000.

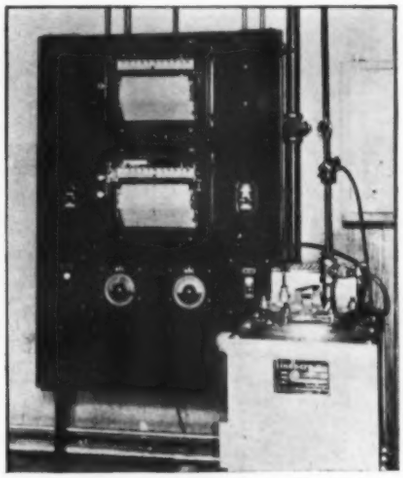
ELECTRONIC CONTROLLER—*Bristol Co., Waterbury, Conn.* Temperatures are transmitted by the electron circuit in this pyrometer controller so that it operates without moving parts in the control mechanism. Vol. 85, p. 1018.



POTENTIOMETER — *Bristol Co., Waterbury, Conn.* The "Pyromaster" round-chart potentiometer controller has no continuously moving parts. Resistant to plant vibration; does not require lubrication. Vol. 85, p. 1017.

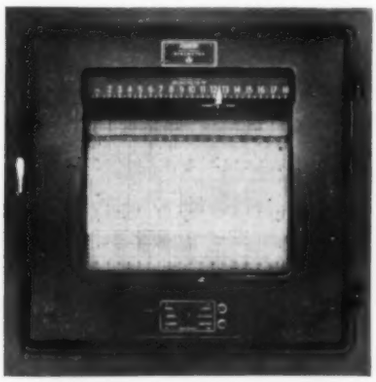


TEAR-OFF DEVICE—*Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.* A tear-off device, which can be quickly and easily attached, has been developed for use on "Micromax" recording instruments. Vol. 85, p. 414.

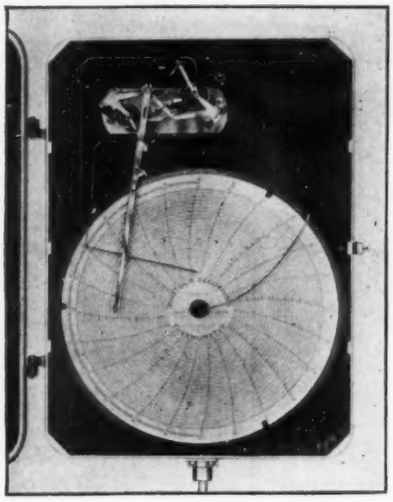


FLEXIBLE CONTROL—*Brown Instrument Co., Philadelphia, Pa.* This flexible program control system using standard potentiometer controllers is particularly adaptable to the completely automatic control of such heat-treating processes as annealing, normalizing, carburizing and stress relieving. Vol. 85, p. 362.

POTENTIOMETER — *Brown Instrument Co., 4501 Wayne Ave., Philadelphia, Pa.* This circular chart potentiometer is unaffected by vibration and designed to be continuously balanced for perfect operation in any position. Vol. 85, p. 1017.

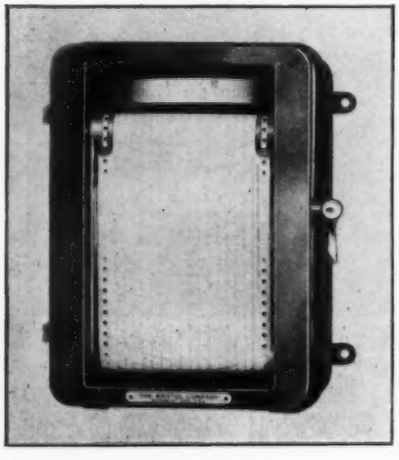


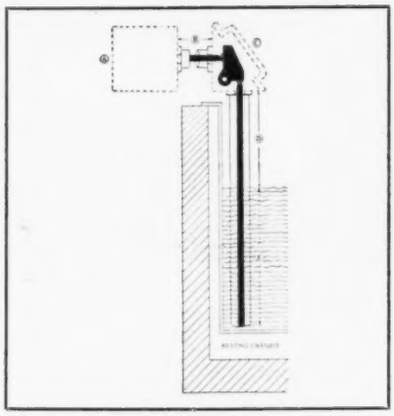
MULTIPLE POINT RECORDER — *Foxboro Co., Foxboro, Mass.* As many as 12 temperature records can be made on the multiple point recorder. Each record is kept in a separate colored dot or numeral on a 12-in. chart. Vol. 85, p. 1016.



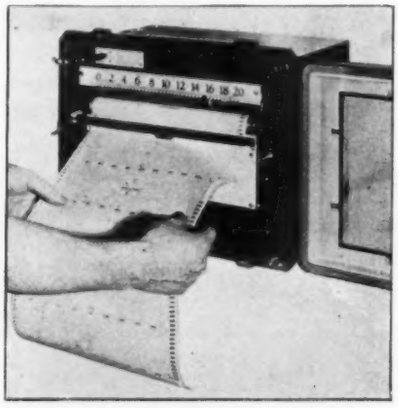
RECORDING THERMOMETER — *Bristol Co., Waterbury, Conn.* The Class I ease-compensated recording thermometer is offered in temperature ranges up to 400 F. and tubing lengths up to 10 ft. or longer, depending on conditions surrounding the installation. The Class I fully compensated recording thermometer may be had in ranges up to 400 F. equipped with 200 ft. or less of connecting tubing between the instrument and the bulb. Vol. 85, p. 320.

POTENTIOMETER INDICATORS — *Foxboro Co., Foxboro, Mass.* Accurate readings of as many as 18 thermocouple circuits can be taken in rapid sequence with these potentiometer indicators. Vol. 85, p. 1016.





HEAT CONTROL ANGLE—*Burling Instrument Co., Newark, N. J.* Perpendicular temperature control instruments can be securely attached to heating containers in such a way as to keep the tube of the instrument as close to the side walls as possible by a device known as the Burling Kosefitting heat-control actuating elbow or angle fitting. Vol. 85, p. 570.



CELECTRAY RECORDERS — *C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.* Celectray recorders and recorder-controllers are now available with a mechanism consisting of a tear-off bar and a re-roll with clip and tape. The clip, of a special design without springs, firmly grips the chart after a section has been removed. Vol. 85, p. 682.

CARTRIDGE TYPE THERMOSTAT—*George Ulanet Co., 89 E. Kinney St., Newark, N. J.* The "Pilotherm" cartridge type thermostat for convenient mounting in any desired location includes a snap switch and box, pilot light and thermostat element, completely assembled and wired, ready for installation. Not shown. Vol. 85, p. 466.

NON-BURNING CARBURIZER—*Park Chemical Co., 8074 Military Ave., Detroit, Mich.* A non-burning carburizer has been developed by coking crushed coal in such a manner that granules are impregnated throughout with energizer. Oxidation and shrinkage is held to a minimum because the coke does not burn after withdrawal from the hot furnace. Not shown. Vol. 85, p. 1015.

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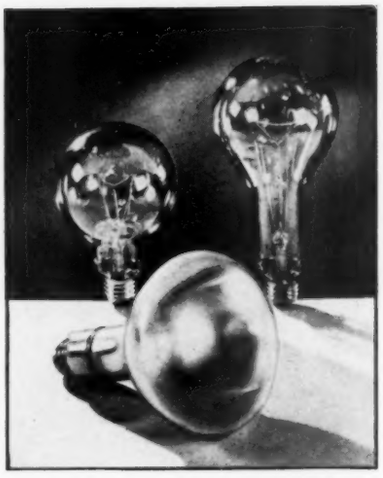
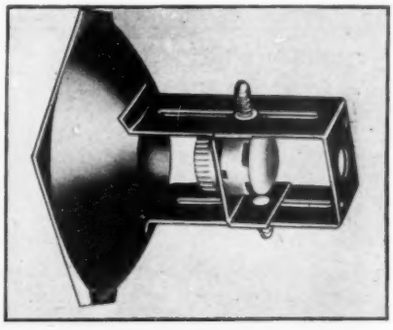
STRIP-CHART RECORDER — *Bristol Co., Waterbury, Conn.* The newly designed strip-chart recorder is available for recording on a 6-in. strip chart: d.c. volts and millivolts, d.c. amperes and milliamperes, pressure, liquid level, flow, temperature, motion and for remote recording, using Bristol's "Metameter" system of telemetering. Vol. 85, p. 516.

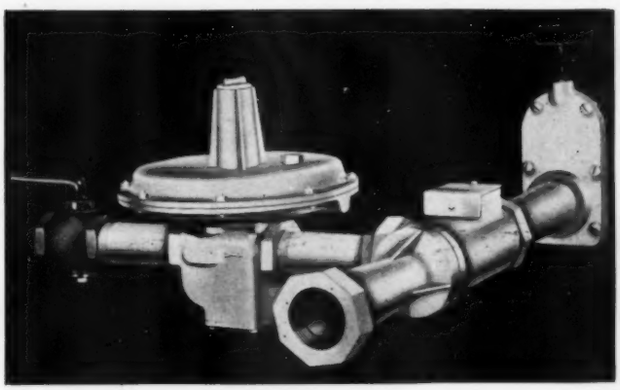


INFRA-RED HEATING LAMPS—*Wabash Appliance Corp., 335 Carroll St., Brooklyn, N. Y.* Three infra-red heat lamps have been developed for industrial finish baking applications. Two of the lamps are clear, for use with standard goldplated or Alzac reflectors, while the third is built with its own reflector lining sealed inside. Vol. 85, p. 513.



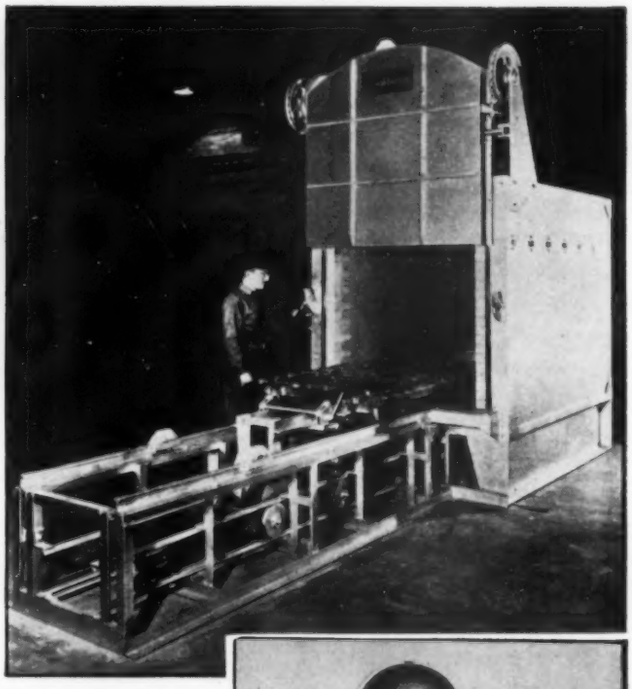
BAKING REFLECTOR — *Fostoria Pressed Steel Corp., Fostoria, Ohio.* The Model QR hexagonal reflector, available in either single units or in multiple assemblies in two sizes, measuring 10¼ in. or 7¾ in. in diameter, makes it possible to nest reflectors with virtually no space between them. Vol. 85, p. 142.

LID-LIFTER—*Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia, Pa.* An improved lid-lifter has been incorporated on the Homocarb cooling unit used in connection with Homocarb furnace equipment for carburizing. Vol. 85, p. 1174.



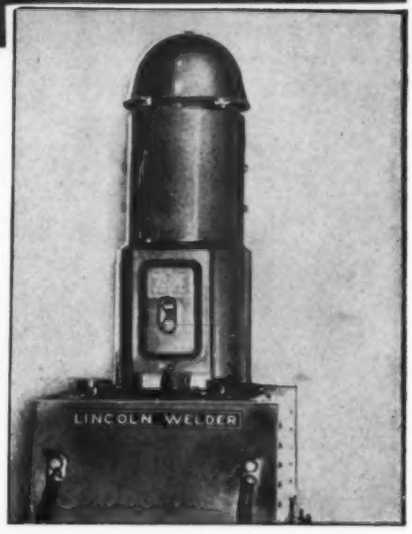
PROPORTIONAL MIXERS — *National Machine Works, 1559 N. Sheffield Ave., Chicago, Ill.* Proportional mixers have been performance rated for over 50 different size flow orifices with capacities ranging from 25,000 Btu. to 10,000,000 Btu. per hour. Vol. 85, p. 1016.

AUTOMATIC ROLLER GRID—*Lindberg Engineering Co., 2450 W. Hubbard St., Chicago, Ill.* The automatic roller grid for use with "Cyclone" forced convection box type furnaces speed up non-ferrous quenching operations. Five standard sizes are available with a temperature range from 200 to 1,250 F. Vol. 85, p. 1116.

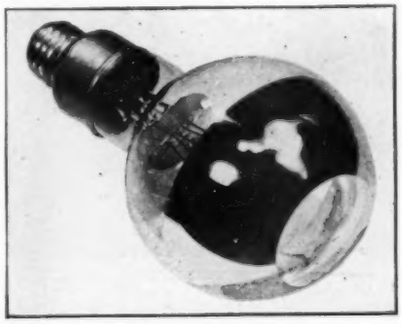


REFRACTORY FORMS—*Quigley Co., 56 W. 45th St., New York, N. Y.* Light weight precast refractory panels, brick, blocks and lagging have low-heat storage and high insulating properties. Vol. 85, p. 1016.

QUENCHING OIL—*E. F. Houghton & Co., Third, American & Somerset Sts., Philadelphia, Pa.* For rapid quenching essential in heat-treatment of high-explosive shell, Houghto-Quench "G" quenching oil is designed to meet the proper range of physical properties, including fire, flash and viscosity, as well as stability and freedom from sludging. Not shown. Vol. 85, p. 1354.

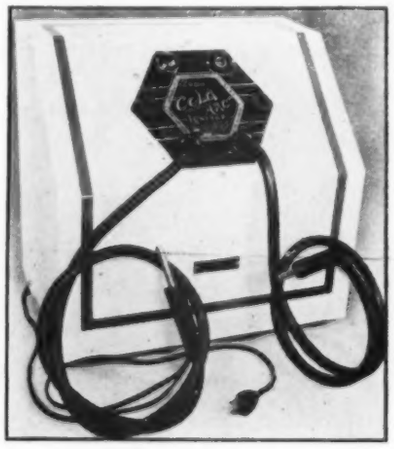


ARC WELDERS—*Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio.* Accurate settings of welding current and voltage control, which are essential for welding the particular analyses and gages of metal employed in modern plane construction, are a feature of this arc-welding machine. Vol. 85, p. 671.

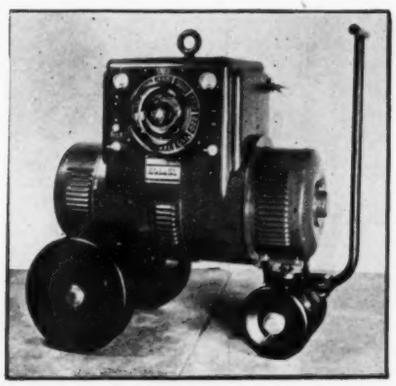


INFRA-RED HEATING LAMP—*Wabash Appliance Corp., 335 Carroll St., Brooklyn, N. Y.* An infra-red heating lamp which projects heat beams from the filament direct to heating area without spill or loss is available in 250 watt size and will have an average burning life in excess of 5,000 hours. Vol. 85, p. 1294.

ARC WELDER — *Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* The "Weld-Master" a.c. arc welder permits simplified welding procedure on small assemblies. Fifteen different welding heats between 20 and 175 amp. give the operator accurate heat and penetration control. Vol. 85, p. 468.



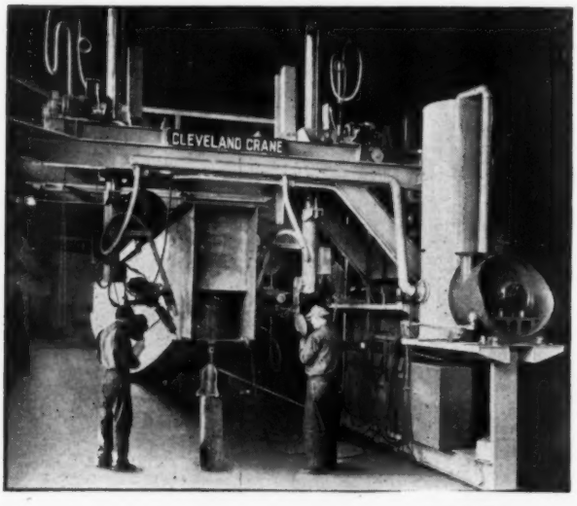
COLD ARC EQUIPMENT—*A C Devices Co., 910 W. Van Buren St., Chicago, Ill.* Very thin metals can be welded without danger of burning through by using the Cold Arc equipment. Vol. 85, p. 1288.



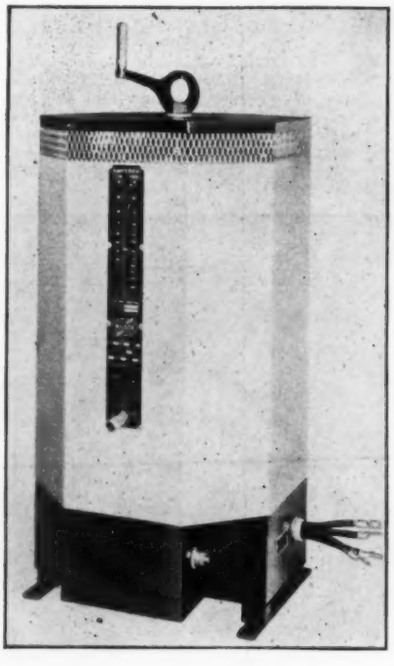
ARC WELDER—*Hobart Brothers Co., Troy, Ohio.* With a welding range from 15 to 125 amp., or 100 amp. continuous service, the "Aircraft Special" motor-generator d.c. arc welder has been designed for production welding in the aircraft field and for other light gage welding. Vol. 85, p. 316.

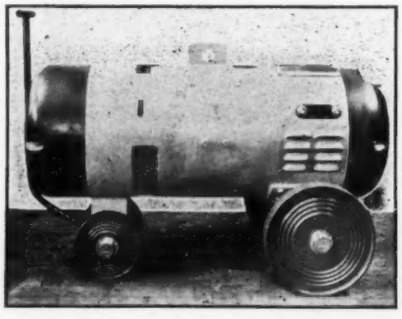
ARC WELDER—*General Electric Co., Schenectady, N. Y.* Chief feature of the Strikeasy 150-amp. d.c. arc welder is its high instantaneous recovery of voltage which helps operator to strike the arc with ease under the difficulties presented by thin, bright metals. Wide welding range permits use of shielded-arc electrodes as large as $\frac{5}{32}$ in. and as small as $\frac{1}{16}$ in. Vol. 85, p. 1237.

HYDROMATIC SPOT WELDER — *Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* Cases for transporting loaded 25 lb. shell are assembly welded at a rate of 180 per hour on the hydromatic welder. Vol. 85, p. 940.



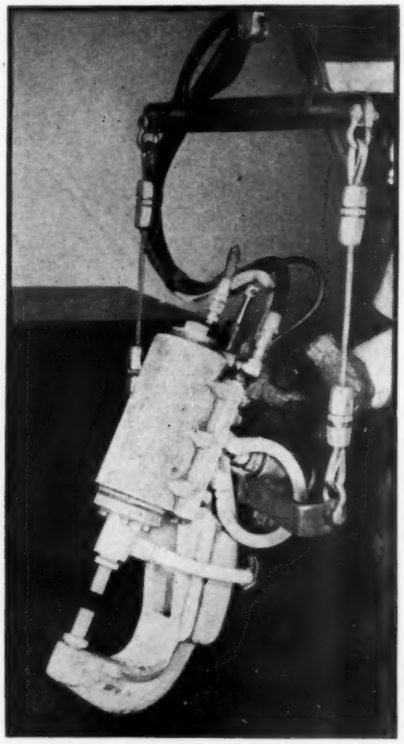
ARC WELDING GANTRY—*Cleveland Crane & Engineering Co., Wickliffe, Ohio.* Welds from 1 to 120 ft. long can be made continuously and automatically with this welding gantry. As the machine travels at any speed from 30 to 148 ft. per hr., welding rod is fed automatically to both sides of the work. Vol. 85, p. 1244.



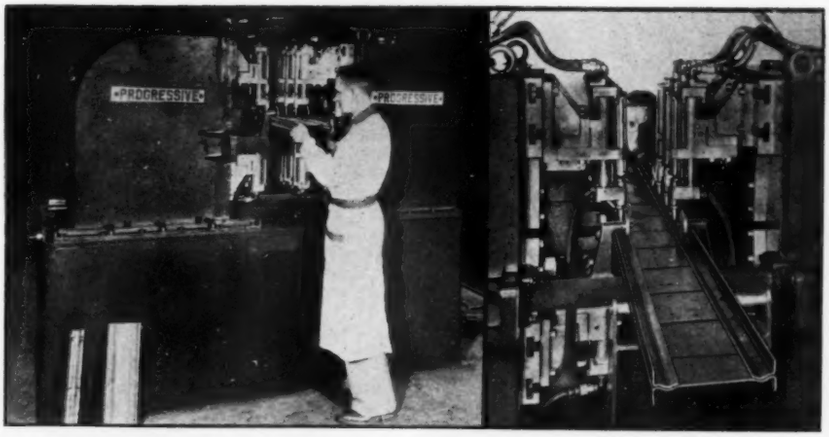


ARC WELDER—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Steady current regardless of arc length is provided by arc control on portable "Flexarc" welder suitable for all-purpose welding in industrial and shipbuilding plants, and for general maintenance work. Ratings are 200, 300, 400 amp. for 220, 440 and 550 volts a.c. Automatic burn-out protection is provided. Vol. 85, p. 1346.

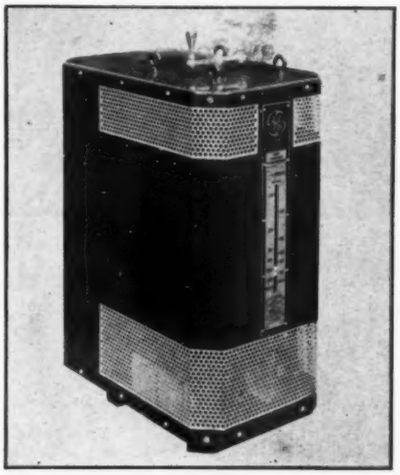
ARC WELDERS—*Wilson Welder & Metals Co., Inc., 60 East 42nd St., New York, N. Y.* The series Model TW transformer welders for arc welding in shipyards, railroads and steel mills, are available in 300, 500, 750 and 1,000 amp. capacities. These self-contained units operate from 220, 440, or 550 volts, 25 or 60 cycle current. Vol. 85, p. 942.



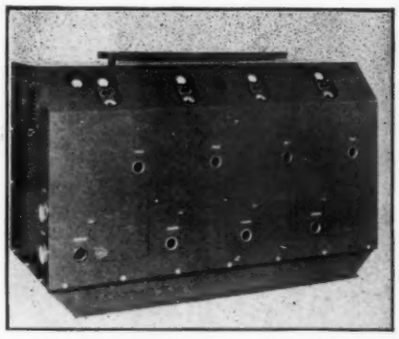
PORTABLE SPOT WELDER — *Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* Portable resistance spot welder for tack welding and assembly of aluminum sections is built into a gun head which may be supplied with yokes to fit individual needs. Using normal factory air-line pressure, maximum point pressure is 1,200 lb. For structural spot welding of aluminum, gun will handle 2 pieces 0.040 in. thick. Vol. 85, p. 1349.



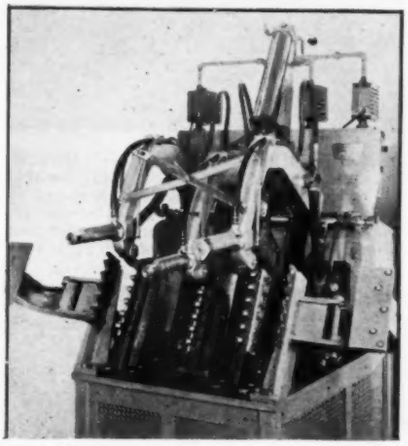
MULTIPLE SPOT WELDER — *Progressive Welder Co.*, 3001 *E. Outer Drive, Detroit, Mich.* A wide range of sizes can be handled by this multiple-spot welding machine, which is capable of a production of 1,200 lineal ft. of "Stran-Steel" members per hour. Vol. 85, p. 186.



ATOMIC-HYDROGEN ARC WELDERS—*General Electric Co., Schenectady, N. Y.* Improved 35- and 75-amp. atomic-hydrogen arc welders are compact and self-contained. A specially designed reactive transformer combines the functions of the transformer and reactor previously used. Vol. 85, p. 570.

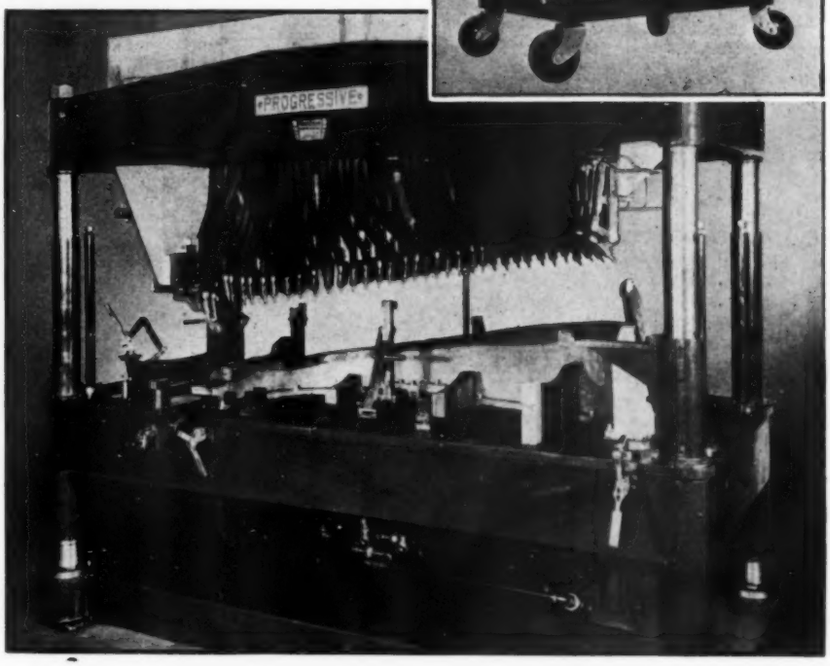


ARC WELDER — *Glenn-Roberts Co.*, 1009 *Fruitvale Ave., Oakland, Calif.* The Model G-R 85 2,000-amp. multi-purpose arc welder will operate either as a single circuit welder with a current range of 100-2,500 amp., or as a 2-, 3- or 4-operator multi-circuit machine with a top output of 2,500 amp. for four units of 625 amp. per circuit. Vol. 85, p. 134.



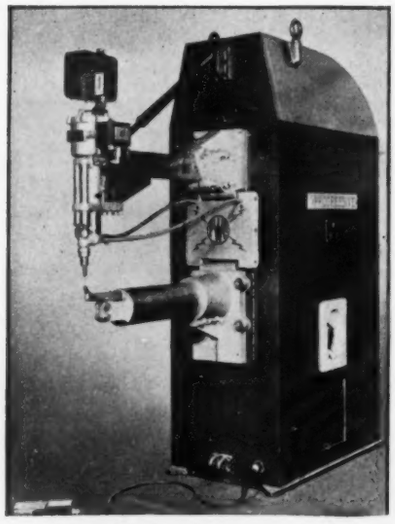
WELDING GUNS—*Progressive Welder Co.*, 3001 *E. Outer Drive, Detroit, Mich.* Automatically locating welding guns, for assemble units built up from a number of parts. Vol. 85, p. 1116.

MULTIPLE SPOT WELDER — *Progressive Welder Co.*, 3001 *E. Outer Drive, Detroit, Mich.* With the ultra-speed unit 3,600 assembly spot welds can be made in an hour. Vol. 85, p. 998.

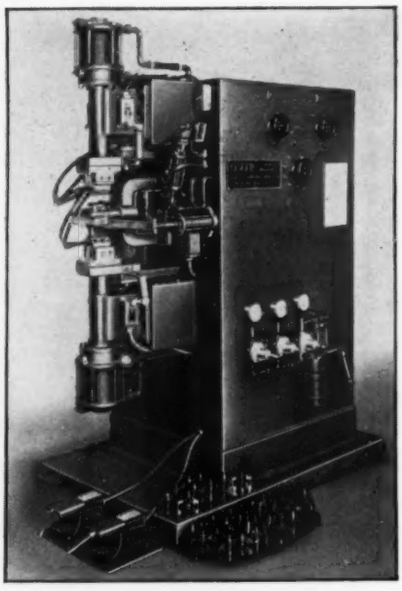


MULTIPLE SPOT WELDER — *Eisler Engineering Co.*, 745 *S. 13th St., Newark, N. J.* This multiple spot welder has been developed especially for work on light sheet metal where a large range of adjustments for various spots and shapes is necessary. Vol. 85, p. 406.

ARC WELDER—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Weighing only 160 lb., the Midget Marvel WT-1 Flexarc welder for use in welding light gage metal, castings and drive shafts, general maintenance, and light production work, comes complete with all accessories. Vol. 85, p. 777.

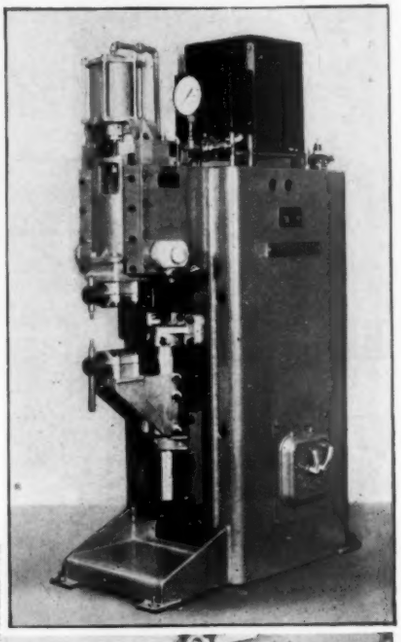


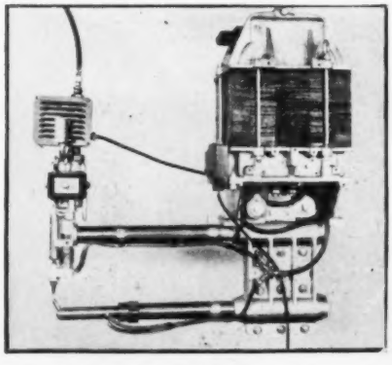
DEEP-THROAT SPOT WELDER — *Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* Heavy tube construction of lower arm eliminates braces, permits sliding assemblies over the arm to full depth. Vol. 85, p. 1004.



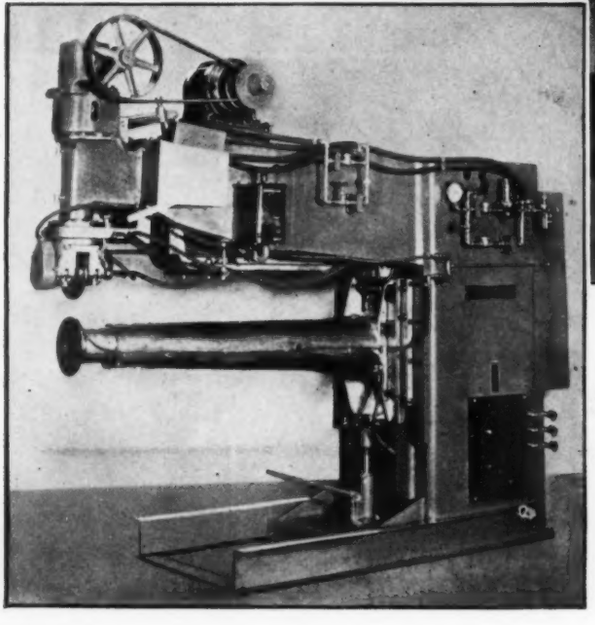
SPOT WELDING MACHINE — *Eisler Engineering Co., 740 S. 13th St., Newark, N. J.* The No. 600-KED air-operated projection spot welding machine is arranged with special jigs and fixtures for welding fins to tubing. Vol. 85, p. 1165.

SPOT WELDER—*Thomson-Gibb Electric Welding Co., 164 Pleasant St., Lynn, Mass.* The Model K air-operated spot welder offers a broad range of combinations for work of heavier caliber. It is available with fixed, adjustable or retractable stroke, or air-lock head action and in transformer ratings of 75, 100 and 125 kva. An 8-point heat regulator is standard equipment. Vol. 85, p. 134.



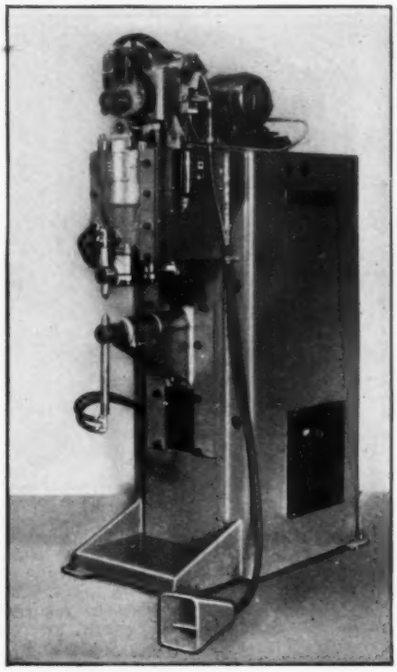


PORTABLE WELDERS — *Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* Portable spot welding machines for suspension from monorails have throats up to 36 in. Vol. 85, p. 1067.

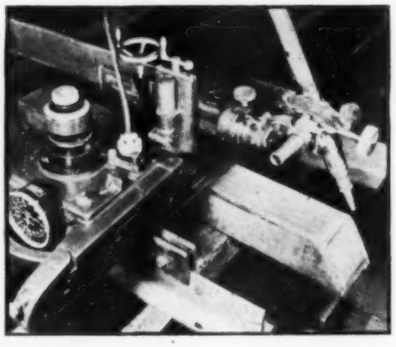


RESISTANCE WELDER—*Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* Aluminum alloy sections, especially those extensively used in the aircraft industry, can be efficiently welded with "Short-Wave" welder. Involving an entirely new principle of operation the process produces welds in aluminum alloy with a uniformity equal to that possible in welding steel in production. Vol. 85, p. 360.

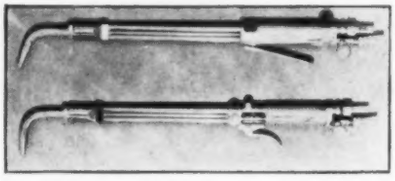
SEAM WELDER—*Thomson-Gibb Electric Welding Co., 164 Pleasant St., Lynn, Mass.* Containers requiring longitudinal seams as long as 54 in. and circular seams as small as 10 in. in diameter can be fabricated on this long-horn seam welder. Ready change-over from circular to longitudinal welding, speed variable from 2 to 12 ft. per min., a 16-point regulator and separate electron control apparatus permitting a wide range of pressures as high as 2,000 lb., are some of the features of this welder. Vol. 85, p. 89.



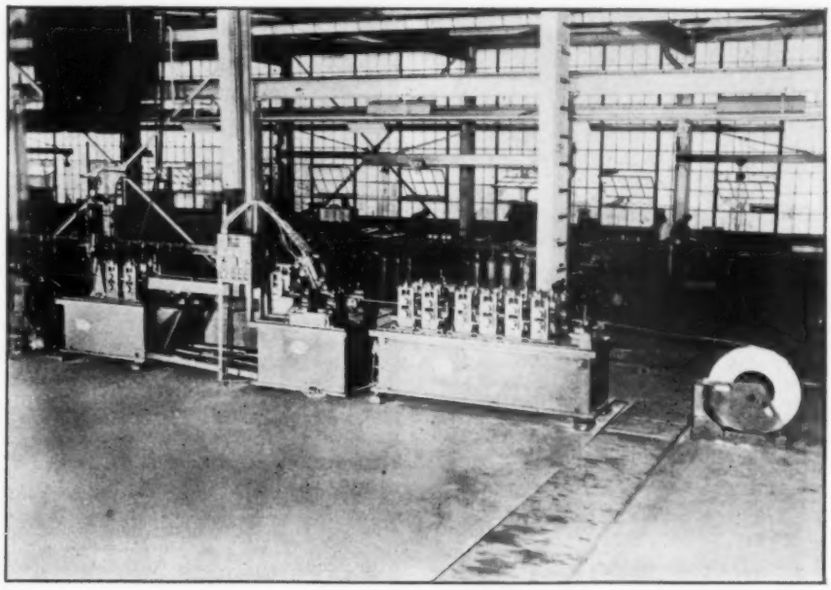
SPOT WELDER—*Thomson-Gibb Electric Welding Co., 164 Pleasant St., Lynn, Mass.* The No. 2 press welder for fast operation on heavy gage material has a special cushioned cam action which eliminates electrode hammer, and an efficient worm reduction unit with a wide range variable speed pully. It is available in two pressure ranges of 100-1,200 lb. and 200-2,500 lb. Four standard speed ranges provide strokes from 17 to 132 per min. Vol. 85, p. 132.



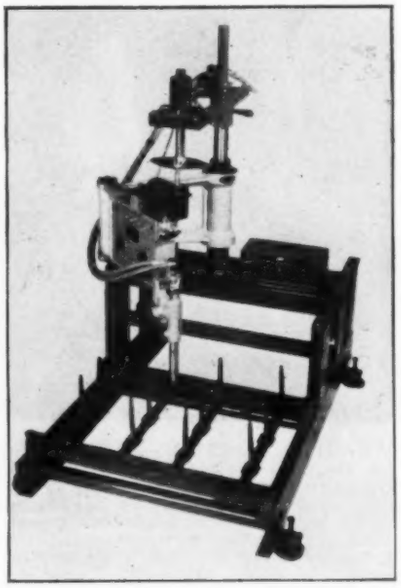
TORCH HOLDER—*Air Reduction Sales Co., 60 E. 42nd St., New York, N. Y.* Accuracy and ease of setting cutting torches is increased by this protractor-type torch holder. It has a 90 deg. angle and can be attached to standard torches. Vol. 85, p. 1076.



CUTTING TORCHES — *Air Reduction Sales Co., 60 E. 42nd St., New York, N. Y.* Greater convenience in removing riser heads from metal castings is made possible with two torches, Styles 3180 and 9080 of the straight head type, and three cutting tips, Style 187, bent to 75 deg.; Style 181, bent to 90 deg.; and Style 191, a straight tip 7 in. long. Vol. 85, p. 416.

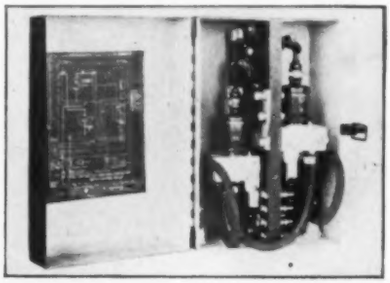


TUBE WELDING MACHINE — *Yoder Co., 5500 Walworth Ave., Cleveland, Ohio, and Linde Air Products Co., 30 E. 42nd St., New York, N. Y.* With this automatic oxy-acetylene welding machine, tubing can be continuously welded from low-carbon, stainless and other alloy steel skelp at high production speeds. Tubing can also be produced from unpickled hot-rolled stock used in the manufacture of low-cost items which do not require a smooth, polished finish. Vol. 85, p. 894.

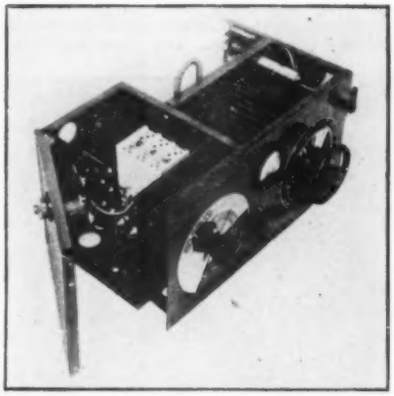


SHAPE CUTTER — *Ohmstede Machine Works, 897-99 N. Main St., Beaumont, Tex.* Circles as large as 32 in. in diameter or all other shapes which will fit into a 56 × 32-in. rectangle can be cut by the Model SC-32 oxy-acetylene flame-cutting machine. The machine may be used as a stationary device or carried from cut to cut. Vol. 85, p. 132.

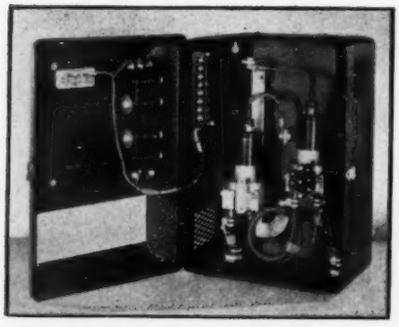
WELDING TORCH—*National Cylinder Gas Co., 205 W. Wacker Drive, Chicago, Ill.* Balanced for precision work, the 7-oz. Rego aircraft torch welds metal thickness up to ¼ in. Vol. 85, p. 946.



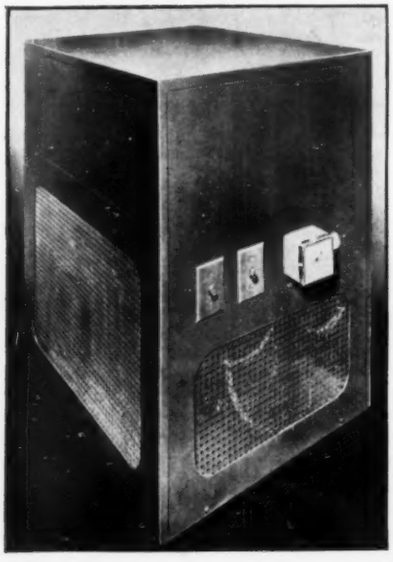
WELDING CONTROL — *General Electric Co., Schenectady, N. Y.* Type GL-415 Ignitron tube for resistance-welder control employs a unique water-cooling system and depends for its cooling upon a special clamp into which it is fitted. Vol. 85, p. 416.



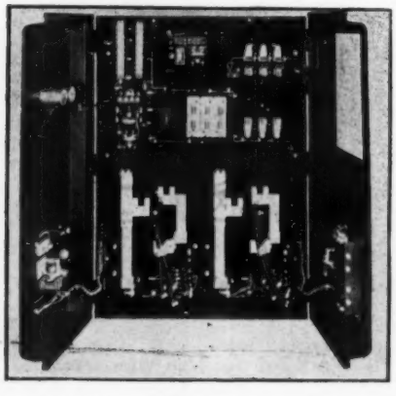
WELDING CONTROL — *Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio.* Among the safety improvements in the dual continuous control box for arc welding machines is the provision of separate compartments for a.c. and d.c. terminals, a locking screw on the a.c. compartment door and special input lugs which lock themselves in position before being bolted to starter terminals. Vol. 85, p. 940.



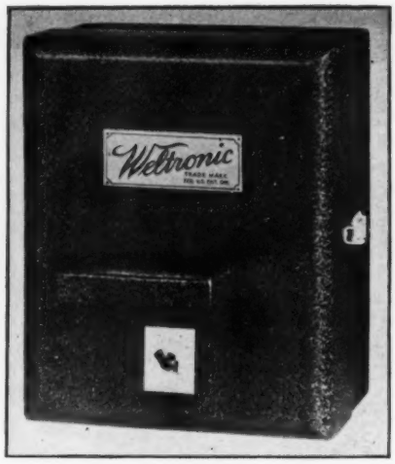
WELDING CONTROL — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* The SW 150 Weld-O-Trol, a new electronic welding contactor for spot welding applications, is rated equivalent to a size 2-W mechanical contactor at 220 or 440 volts, 50/60 cycles. Vol. 85, p. 836.



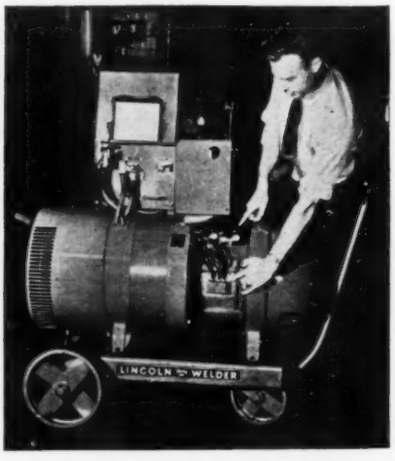
SPOT WELDING REFRIGERATION UNIT—*Progressive Welder Co., 3001 W. Wacker Drive, Detroit, Mich.* Available for one, two or four welding machines, this refrigeration unit makes possible four to ten times as many spot welds as usually can be obtained without point dressing. Electrode temperature reduction so increases point life that 10 welds per minute are possible. Vol. 85, p. 1165.



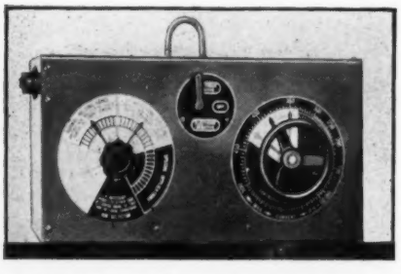
WELDING CONTROL — *Weltronic Corp., 3051 E. Outer Drive, Detroit, Mich.* Complete power and control units are assembled in steel panel cabinets to meet individual users requirements and are available for any type of welding equipment. Vol. 85, p. 1002.



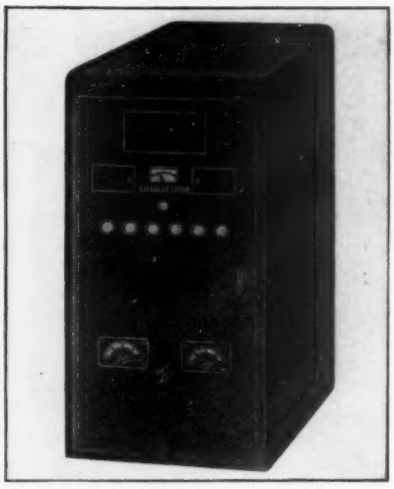
WELDING CONTROL — *Weltronic Corp., 3051 E. Outer Drive, Detroit, Mich.* For use in multi-point welding, the Model 50-W heat control is provided with a number of dials corresponding to the number of different welds for which current control is desired. Model 50-Y is designed for current control for single welds and Model 50-XX is an automatic heat rise control for either single-spot or pulsation welding. Vol. 85, p. 938.



WELDING CONTROL—*Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio.* Complete protection against heat or excessive current is provided by this control device for arc welding machines. It consists of two current transformers, the primaries of which are connected in series. Vol. 85, p. 1165.

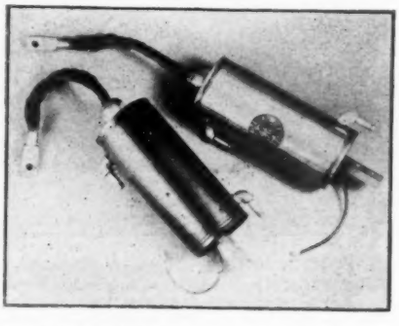


WELDING CONTROL—*Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio.* With the simplified "Dual Continuous Control" for arc welding machines, slope of volt-ampere curve and amount of welding current can be independently and accurately adjusted to suit every job. The current can be set and read from the dial. Vol. 85, p. 1349.

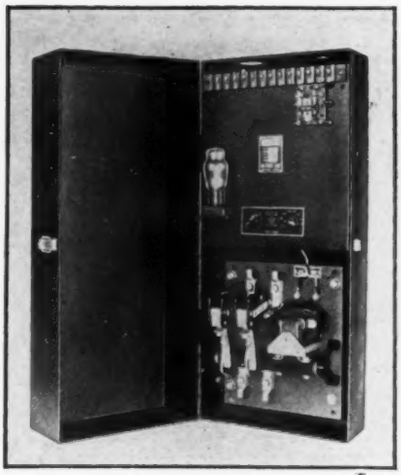


WELDING CONTROL — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Designed for operation on 230/460 volts, 3 phase, 50 or 60 cycles, the Condens-O-Weld includes in one floor-mounted cabinet all the necessary apparatus required to control an electrostatic energy storage type of welder. Vol. 85, p. 632.

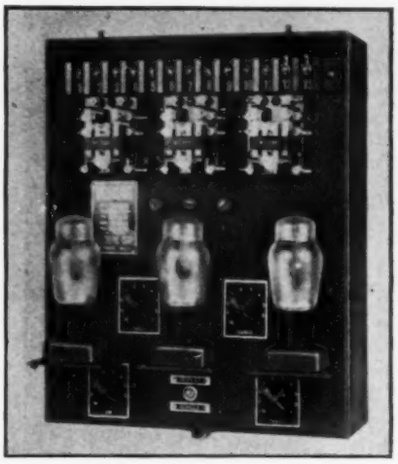
WELDING RECTIFIER — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Designed especially for supplying d.c. power to magnetic energy-storage type spot welders, this ignitron spot welding rectifier is available in two capacities, one for use with 40-kw., the other for 120-kw. spot welders. Each rectifier will operate two welders. Vol. 85, p. 368.



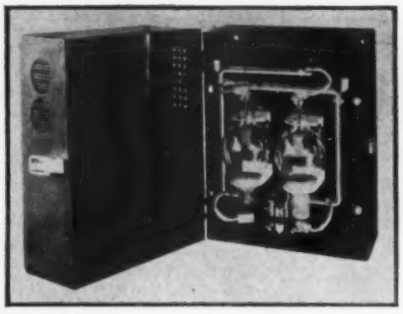
WELDER TUBES — *General Electric Co., Schenectady, N. Y.* Redesigned line of "Ignitron" tubes for resistance welder control incorporate both inner and outer jackets of stainless steel. Vol. 85, p. 132.



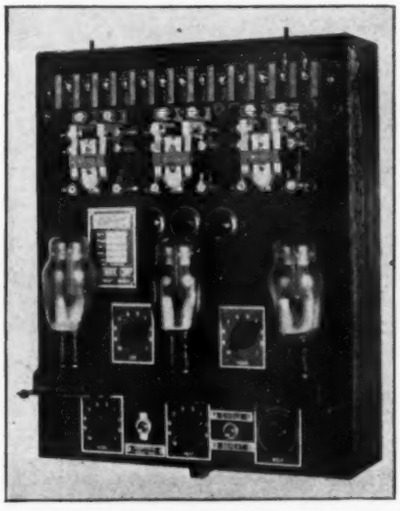
TIMER-CONTACTOR — *Weltronic Corp.*, 3051 *E. Outer Drive, Detroit, Mich.* This Model 108-53 timer-contactor is available for 220, 440, or 550 volts and for 25, 40, 50 or 60 cycles, adjustable over a timing range of 2 to 30 cycles, to be used with any 15- to 35-kva. manually or mechanically timed spot welder. Two control knobs provide close adjustment. Vol. 85, p. 90.



WELDING TIMER — *Weltronic Corp.*, 3051 *E. Outer Drive, Detroit, Mich.* The Model 75 electronic tube timer is available for use with either a magnetic or Ignitron tube contactor and is standard for 110 volt 60 cycle operation. Featuring a minimum of moving parts as well as eliminating the need of a pressure switch, this timer insures minimum maintenance costs. Vol. 85, p. 188.



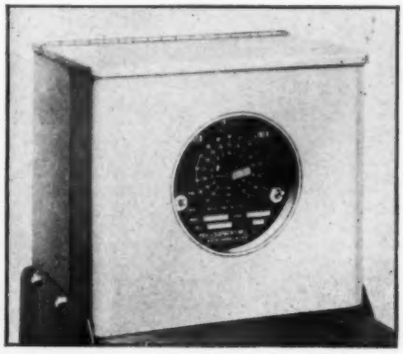
TUBE CONTACTOR—*Weltronic Corp.*, 3051 *E. Outer Drive, Detroit, Mich.* Simple to install by virtue of the fact that no water connections are required, the new "Stat-o-Tron" contactor designed for spot, projection and butt welders, has the added advantage of permitting its use on small welding equipment. Vol. 85, p. 732.



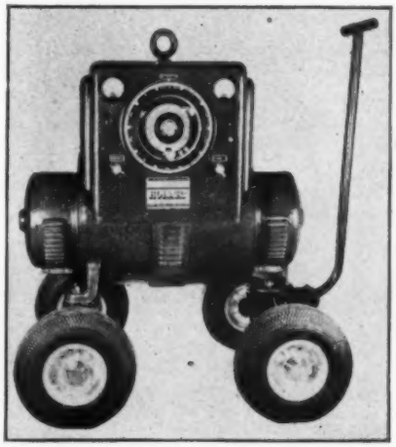
WELDING TIMERS—*Weltronic Corp.*, 3051 *E. Outer Drive, Detroit, Mich.* Welding operations heretofore extremely difficult can now be made with ease with a semi-automatic (Model No. 114) or a high speed automatic (Model No. 57) timer. Both are adjustable for "on" time, "weld" time, "cool" time, and for the number of interruptions of current desired. The high speed automatic has in addition a dial for regulating the "off" time. Vol. 85, p. 629.

WELDER SYNCHRONIZER — *Weltronic Corp.*, 3051 *E. Outer Drive, Detroit, Mich.* Supplied in a dust-proof steel cabinet approximately 30 in. high, 12 in. wide and 12 in. thick, this electronic synchronizer has been developed for use with any non-synchronous timer and power tube contactor, to eliminate transient currents and resulting stresses in welding transformers. Not shown. Vol. 85, p. 323.

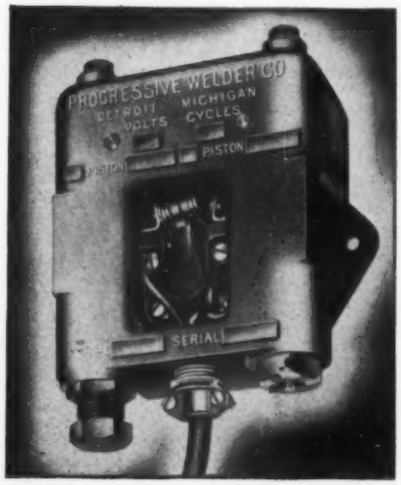
WELDING TIMERS—*Weltronic Corp.*, 3051 *E. Outer Drive, Detroit, Mich.* The Model 52 general-purpose timer employs a vacuum tube as the timing element. This timer has a wide range of operation. Not shown. Vol. 85, p. 143.



WELDING TIMER — *Pier Equipment Mfg. Co., Milton and Cross Sts., Benton Harbor, Mich.* Increased production and uniform welds are assured with this precision timer for automatically controlling the welding time on spot welders. Welding time can be quickly selected from 3 to 47 cycles. Vol. 85, p. 1290.

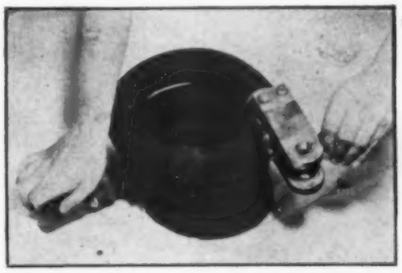


WELDER TRAILER—*Hobart Brothers Co., Hobart Square, Troy, Ohio.* Electric drive welders are easily mounted on this four wheeled, light weight, pneumatic tired trailer which has a tilting angle of 25 percent. Vol. 85, p. 940.



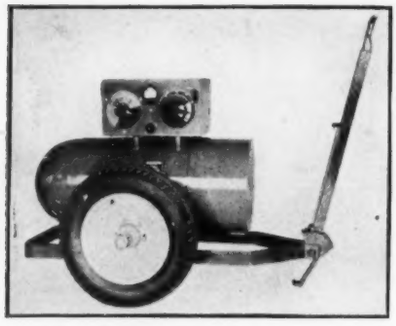
WELDER SWITCH — *Progressive Welder Co.*, 3001 *E. Outer Drive, Detroit, Mich.* This universal non-flutter, positive snap-action, hydraulic pressure switch for use throughout the entire range of two separate capacities with only a nominal change is made explosion, dirt, oil and moisture proof. Vol. 85, p. 136.

ELECTRODES—*Metal & Thermit Corp.*, 120 *Broadway, New York, N. Y.* "Alternex" electrodes are designed especially for use with transformer type a.c. welding equipment. Not shown. Vol. 85, p. 42.

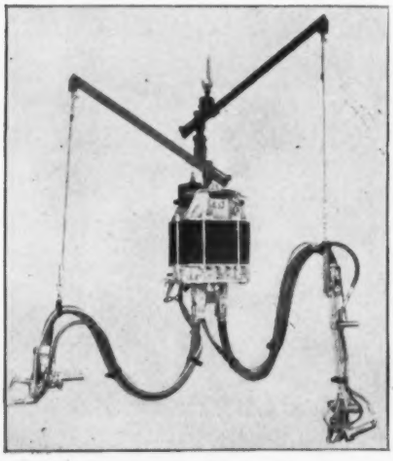


WELDING CABLE—*Progressive Welder Co.*, 3001 *E. Outer Drive, Detroit, Mich.* Developed in conjunction with Habirshaw Cable & Wire Co., the "P-H" low cost kickless welding cables of full concentric design for reduced current loss and with positive and negative current strands wound at steep helical angles to increase ease of flexing and reduce wear are available in a complete range of capacities. Vol. 85, p. 513.

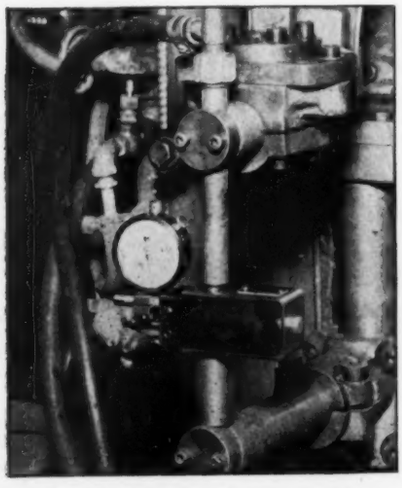
WELDING, HEAT-TREATING, CLEANING and FINISHING



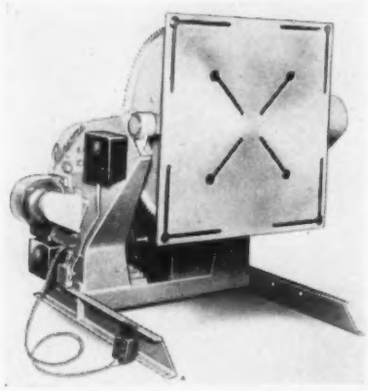
TWO-WHEELED TRAILER—*The Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio.* Designed for mounting either Lincoln SAE 200-amp. to 600 amp. a.c. motor-driven or Type SA 200 special engine-driven arc welders, the low underslung construction, narrow 31-in. tread and method of balancing facilitates maneuvering of this two-wheeled light-weight pneumatic-tired trailer in shop, yard or on the road. Vol. 85, p. 782.



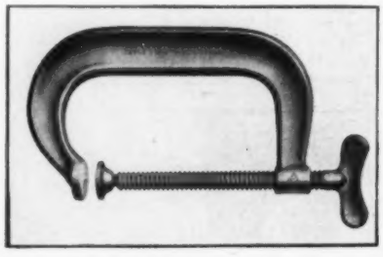
SPRINGLESS HANGERS—*Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* Compound springless, adjustable hangers are suitable for counterbalancing two separate units such as welding guns. They come in two sizes. Vol. 85, p. 1298.



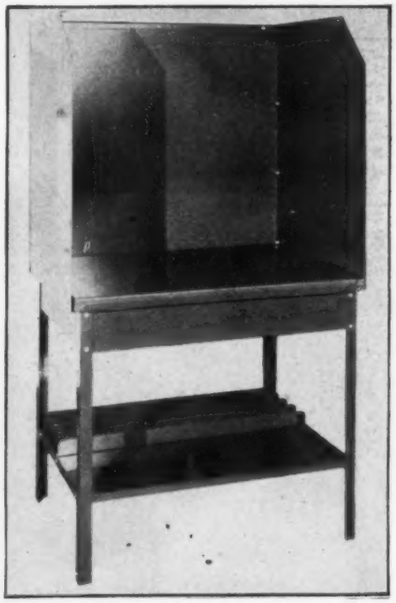
ELECTRODE PRESSURE GAGE — *General Electric Co., Schenectady, N. Y.* The pressure between the electrodes of resistance-welding machines can be measured by this electrode pressure gage which measures pressures from 0 to 4,500 lb. Vol. 85, p. 630.



WELDING POSITIONER — *Ransome Concrete Machinery Co., Dunellen, N. J.* This heavy-duty 3,000 lb. welding positioner has a 40-in. square machined steel table top, provided with four radial and four longitudinal T-slots which take ¾ in. bolts. Vol. 85, p. 1021.

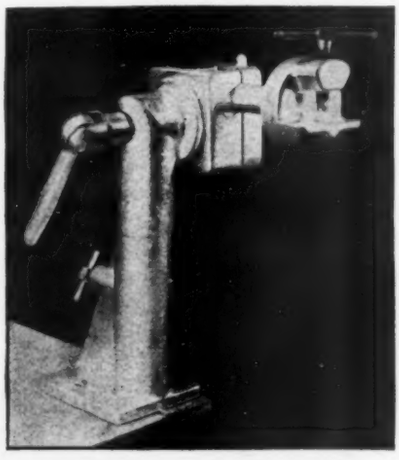


SPATTER-RESISTING CLAMP — *J. H. Williams & Co., 225 Lafayette St., New York, N. Y.* Available in seven sizes, with opening ranges from 2 to 12 in. and a special spatter-resisting finish, this drop-forged C-clamp resists the adherence of welding spatter to the body, swivel and screw. Vol. 85, p. 522.

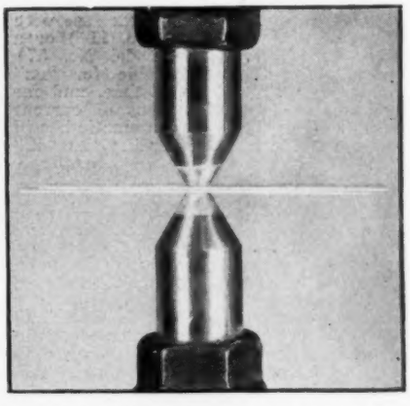


WELDING BENCHES — *Lyon Metal Products, Inc., 3011 Clark St., Aurora, Ill.* Both the arc welding bench, which has a 10 gage steel working top, 33 in. from the floor, and the gas welding bench, built to support a firebrick top 34 in. from the floor, have a storage shelf with four separators for welding rods. Vol. 85, p. 997.

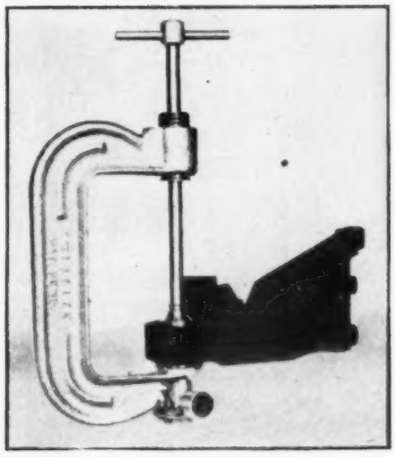
WELDING TRUCK—*Linde Air Products Co., a unit of Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.* This hand truck designed to carry an oxygen cylinder, an acetylene cylinder, and a complete welding and cutting outfit, is known as the "Oxweld" T-7 two-wheel welding truck. Vol. 85, p. 414.



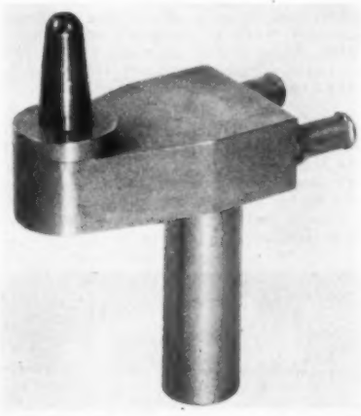
WELDING JIG—*Stoody Co., Whittier, Calif.* Easily adjusted to any position, this welding jig was designed for use in the hard-facing of small equipment. All parts are made of cast iron, eliminating any danger of freezing. Vol. 85, p. 998.



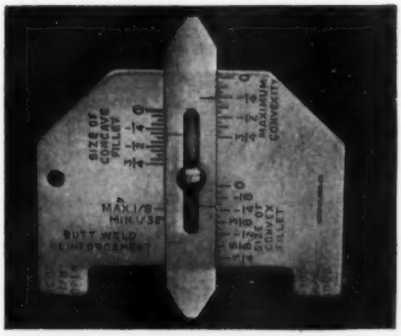
ELECTRODE ALLOY — *Progressive Welder Co., 3001 E. Outer Drive, Detroit, Mich.* Electrodes fitted with inserted tips of a special alloy to reduce pick-up and resist mushrooming in spot welding aluminum can be secured in any standard or special shape. Vol. 85, p. 1244.



GROUND CLAMP — *Michigan Clamp Co., Jackson, Mich.* This ground clamp, incorporating the features of the "Twistite C clamps", is spatter-proof. Vol. 85, p. 1074.



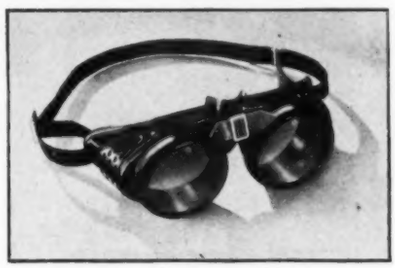
OFFSET ELECTRODE HOLDER—*P. R. Mallory & Co., 3029 E. Washington St., Indianapolis, Ind.* This offset electrode holder, fabricated from wrought copper base alloys of high strength incorporates a patented tip knockout device which makes it possible to easily replace worn out points. Vol. 85, p. 1023.



WELDING GAGE—*Chicago Tool & Engineering Co., 8939 S. Chicago Ave., Chicago, Ill.* Butt and fillet type welds can be accurately calibrated with this convenient, pocket-size Palmgren welding gage. Vol. 85, p. 836.

BLUE GLASS—*Willson Products, Inc., Reading, Pa.* "Alubro-Weld" blue glass filters out injurious light rays resulting from welding aluminum and bronze, enabling welders to see their work better and control the flow of metal more easily. Not shown. Vol. 85, p. 524.

BRAZING ALLOYS — *Weldoloy Mfg. Co., Div. of Park Sales Co., 3 Park Place, New York, N. Y.* "Weldoloy" brazing mediums and fluxes are available in a variety of alloys and fluxes for oxy-acetylene use, the alloys being supplied in rod form and the fluxes in powder or paste form. Types of "Weldoloy" include: No. 690, for joining aluminum and its alloys; No. 685, for steel, cast iron, copper, brass, bronze, etc.; No. 514, for cast iron; No. 516, for steel; No. 518, for copper, brass, extruded bronze, etc.; No. 710, for cast aluminum; No. 688, for die castings. Not shown. Vol. 85, p. 194.



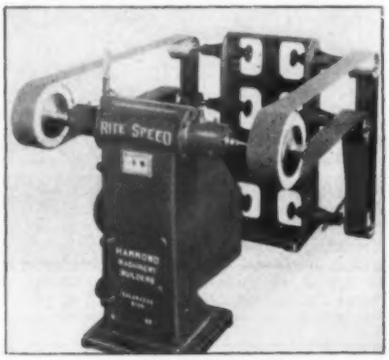
WELDING GOGGLES — *Bausch & Lomb Optical Co., Rochester, N. Y.* "Arc-Ban" welding goggles are of the louver side-shield construction, with louvers automatically located in such a way that there is a direct channel for air passage, though all light is excluded. Two models are offered to take care of workmen with corrective spectacles and those whose eyes need no correction. Vol. 85, p. 412.

HARD FACING ELECTRODES—*Scully Steel Products Co., 1319 Wabansia Ave., Chicago, Ill.* Six types of hard facing welding electrodes are: Econoloy for self-hardening; Ranalloy "C" for general work at low cost; Ranalloy "A" for general work at medium cost; Ranalloy "B" for extreme abrasion resistance; Supraloy for extreme hardness and Corosoloy for corrosion abrasion resistance. Not shown. Vol. 85, p. 1019.

ARC-WELDING ELECTRODES—*General Electric Co., Schenectady, N. Y.* Three new shielded-arc electrodes are Type W-30, an A.W.S. E-6012 all-position electrode especially designed for automotive and piece-work industries; Type W-83, for job welders or manufacturers engaged in the fabrication or repair of cast iron; Type W-93, for building up steel surfaces to resist wear from shock, abrasion, and rolling impact have been announced. Not shown. Vol. 85, p. 470.

TIN FLUX—*Hanson-Van Winkle-Munning Co., Matawan, N. J.* A special tin flux called "Fas-Tin-Flux" is a liquid of the zinc chloride type for use in hot tinning, in the manufacture of Terne plate (lead-tin alloy) and for soldering. Not shown. Vol. 85, p. 524.

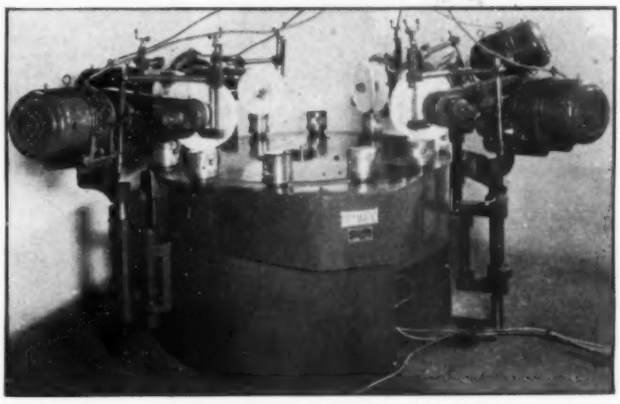
POLISHING AND PLATING MACHINERY—*Bruce Products Corp., 5712 Twelfth St., Detroit, Mich.* Featuring adjustable speed and rugged construction for long life, "Bruko" electro-platers' machinery includes various models of polishing and buffing lathes, straight-line polishing and buffing machines, and plating generators. Vol. 85, p. 360.

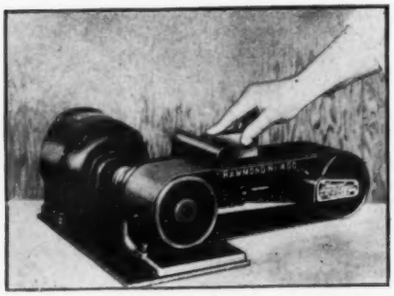


BELT STAND — *Hammond Machinery Builders, Inc., 1618 Douglas Ave., Kalamazoo, Mich.* Proper tension of belts is maintained by an adjustable pulley on this abrasive belt stand for use in conjunction with polishing and buffing lathes. Belts of various sizes can be removed and replaced quickly. Vol. 85, p. 88.

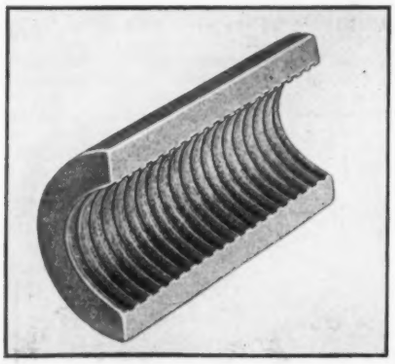
STAINLESS STEEL POLISHES — *Hanson-Van Winkle-Munning Co., Matawan, N. J.* An extensive line of rouges and other compounds for polishing stainless steel using special levigated alumina flour have been developed. Vol. 85, p. 417.

AUTOMATIC BUFFER — *Udylite Corp., 1651 E. Grand Blvd., Detroit, Mich.* Sides and tops of aluminum aircraft pistons are buffed in 15 sec. with this automatic machine compared with 10 min. by previous hand-operated buffing lathes. Pistons are loaded on chucks and indexed automatically to each buffing station. Vol. 85, p. 1067.

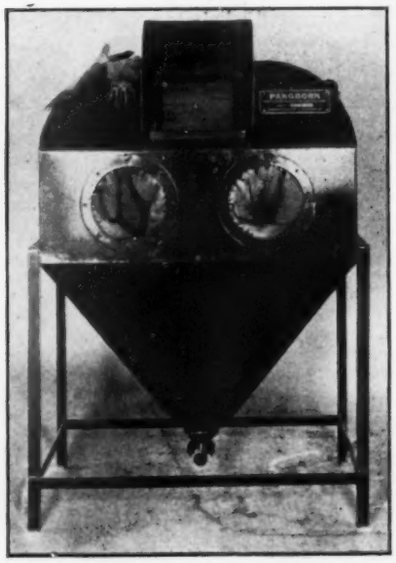




BELT SURFACER—*Hammond Machinery Builders, Inc., 1618 Douglas Ave., Kalamazoo, Mich.* Versatility in the type and number of different materials successfully finished is an outstanding feature of the "400" bench type belt surfacer for wet or dry buffing, burring, surfacing, or polishing. Belts, of which a wide variety can be used, are 4 × 35 in. endless type. Vol. 85, p. 777.

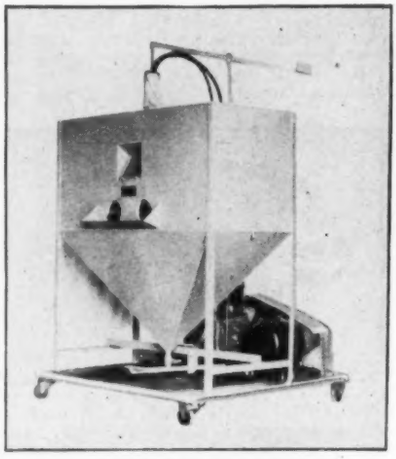


FINISHER AND POLISHER—*Weldon Roberts Rubber Co., Sixth Ave. and N. 13th St., Newark, N. J.* The half-round Brightboy tablet, a soft rubber binder which cushions the abrasive, is designed to speed the finishing and polishing of curved metal surfaces. Vol. 85, p. 680.

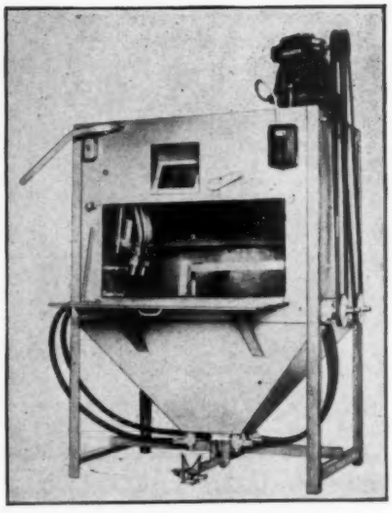


BLAST CLEANING CABINET—*Pangborn Corp., Hagerstown, Md.* This small blast cleaning unit will clean work up to 10 × 12 × 30 in. by sand or steel abrasives at air pressures above 20 lb. A ⅜ in. air jet with ½ in. nozzle is ordinarily furnished. The unit is 24 in. wide, 45 in. long and 68 in. high. It weighs 290 lb. Vol. 85, p. 1168.

POLISHING WHEELS — *Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.* Available in a complete range of sizes, and in stick and sheets for hand lapping, soft rubber polishing wheels having five different types of polishing compound impregnated into a special rubber binder. Not shown. Vol. 85, p. 523.

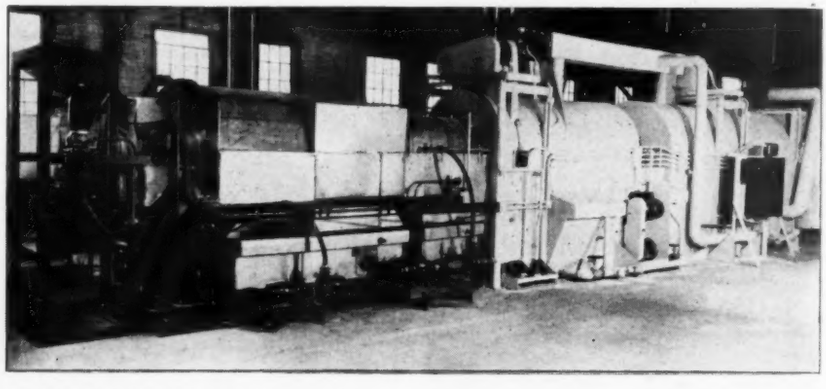


SANDBLASTING MACHINE—*Leiman Bros., Inc., Christie St., Newark, N. J.* Pieces measuring up to 2 ft. square, or parts which are too heavy to be held in the hand, can be sandblasted easily with Type C machine. Unit is regularly equipped with a nozzle to handle air pressures of under 5 lb., although nozzles for pressures as high as 100 lb. can be furnished. Vol. 85, p. 140.

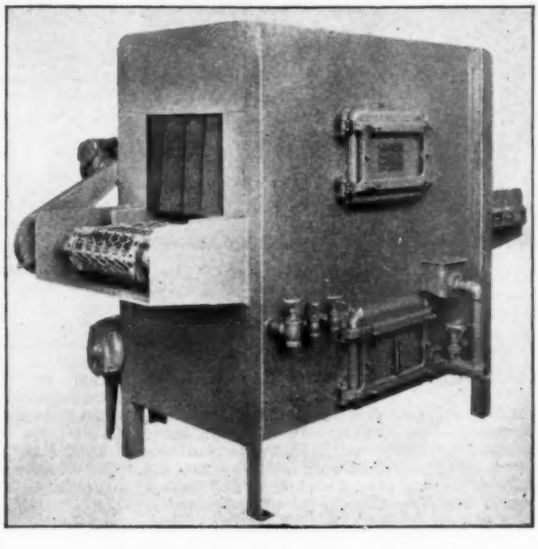


AUTOMATIC SANDBLAST — *Leiman Bros., Inc., Christie St., Newark, N. J.* This four-nozzle cabinet type sandblast machine for cleaning and finishing the inside and outside of tubing and solid pieces of work is equipped with two rotating fixtures for holding and turning the parts. Size of cabinet, 36 × 48 in.; height of cabinet, 68 in. Vol. 85, p. 268.

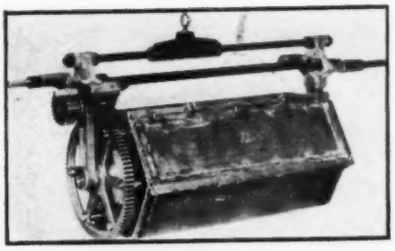
PORTABLE DEGREASER — *Phillips Mfg. Co., 340 W. Huron St., Chicago, Ill.* The Model 14 bench-type "Phill-Co" portable degreaser is designed for cleaning light metal parts, stampings, screws, dies, tools and instruments. Not shown. Vol. 85, p. 1022.



BATCH PICKLER — *N. Ransohoff, Inc., Elmwood Place, Cincinnati, Ohio.* Completely automatic, this batch finish pickler used to put the final finish on .30 and .50 cal. cartridge cases, consists of three batch rolling or tumbling barrels in series. Power loader to receive work at ground level can be attached. Vol. 85, p. 1300.



WASHING-MACHINE—*Alvey-Ferguson Co., Oakley Station, Cincinnati, Ohio.* A multitude of various size and shape metal parts can be thoroughly cleaned with the A-F industrial washing machine. Usually a steam coil is used to heat and maintain temperature of cleaning solution, but gas or electric elements can be used. Vol. 85, p. 1242.



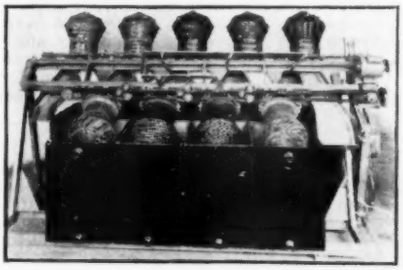
CLEANING PROCESS — *Hanson-Van Winkle-Munning Co., Matawan, N. J.* Cylindrical equipment for processing from 600 to 700 shell of 20 mm. size at one time includes rotary cleaning unit with loading compartment. There is a double station hot sulphuric acid pickling tank and spray, and cold and hot rinse tanks. The first three compartments are lead lined. Vol. 85, p. 1072.

INDUSTRIAL BRUSHES — *Plastics Dept., E. I. duPont de Nemours & Co., Wilmington, Del.* Nylon has been successfully adapted for a series of brushes which relieve the American porcelain enamel industry from dependence upon Tampico fiber and uncertain imports of Oriental hog bristle. Not shown. Vol. 85, p. 275.

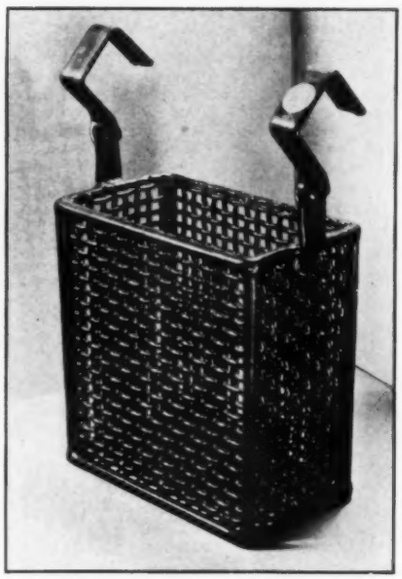
PROTECTIVE COATING—*Glyco Products Co.*, 230 *King St., Brooklyn, N. Y.* An emulsion of paraffin wax and Flexo Wax C, made with Diglycol Stearate S, can be applied easily to aluminum castings by spraying in the cold, leaving a film of water-repellant wax which completely protects the metal parts. Not shown. Vol. 85, p. 674.

METAL COATING—*Truscon Laboratories, Detroit, Mich.* Paratex metal coating, a chlorinated rubber base paint, especially adapted to all types of exposed iron and steel, is available in all standard size containers, and in standard colors of red, light gray, light green, steel gray, dark green, brown, white and black. Not shown. Vol. 85, p. 787.

INHIBITORS—*Alox Corp.*, 3943 *Buffalo Ave., Niagara Falls, N. Y.* Inhibitors have been developed for the control of corrosion in water and other systems such as alcohol-water-metal and gasoline-metal-water. Par-al-ketone base inhibitor is a corrosion preventive compound used to protect exterior surfaces of airplanes. Not shown. Vol. 85, p. 1022.



CLEANING AND PLATING BARREL —*Udylite Corp.*, 1651 *E. Grand Blvd., Detroit, Mich.* In this fully automatic barrel cleaning and plating machine, parts are progressively subjected to the cleaning, rinsing, pickling, plating and drying operations without manual handling. Vol. 85, p. 1068.

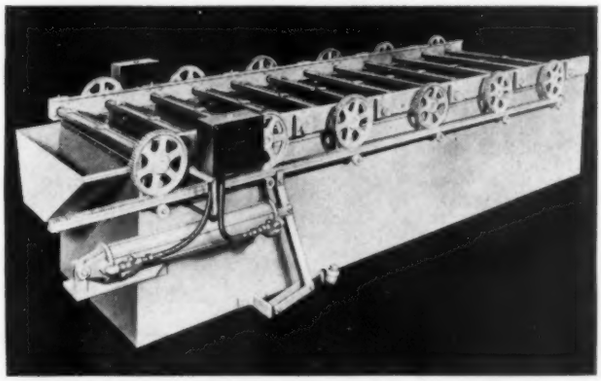


TIN FINISH — *Alrose Chemical Co., Providence, R. I.* Bon White, a new immersion tin finish applicable to all copper and brass surfaces, can be applied in ten seconds and can, in many instances, replace slow boiling methods of tin plating. Not shown. Vol. 85, p. 838.

←

ANODE SCRAP BASKETS—*Hanson-Van Winkle-Munning Co., Matawan, N. J.* In a new type of basket for handling scrap anodes, the stubs of used anodes are placed in the basket around a new anode, allowing the stub metal to be completely used. Baskets can be used in solutions where temperature does not exceed 180 to 190 F. Vol. 85, p. 784.

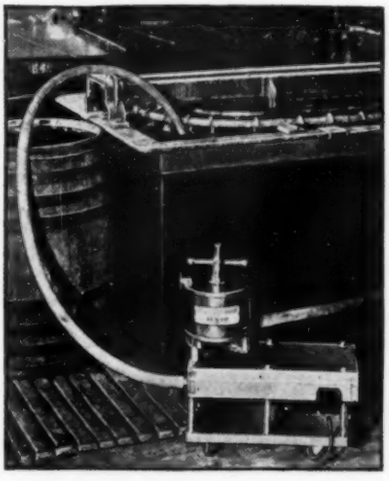
AUTOMATIC PARKERIZING MACHINE—*Udylite Corp.*, 1651 *E. Grand Blvd., Detroit, Mich.* The automatic parkerizing machine is being used on the production of Cal. .30 and .50 machine gun links, Garand rifle parts, and other small items. The machine is air or hydraulic driven. Eight or ten hand operations are eliminated, no protective clothing is necessary and better production control results. Vol. 85, p. 1347.

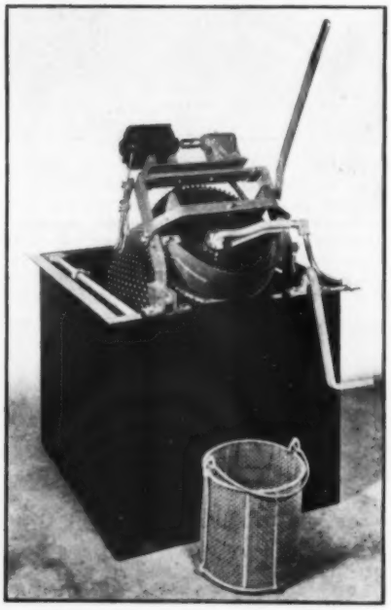


BARREL PLATING MACHINE—*Udylite Corp.*, 1651 *E. Grand Blvd., Detroit, Mich.* Suitable for a variety of purposes such as cleaning, drying, plating, rinsing or pickling this barrel plating machine, known as the "Multi-Purpose" unit, has a tank measuring 32 × 36 × 30 in., of ⅜-in. steel welded inside and out, with 125-gal. capacity. Cylinder is 23 × 23 in. Vol. 85, p. 778.

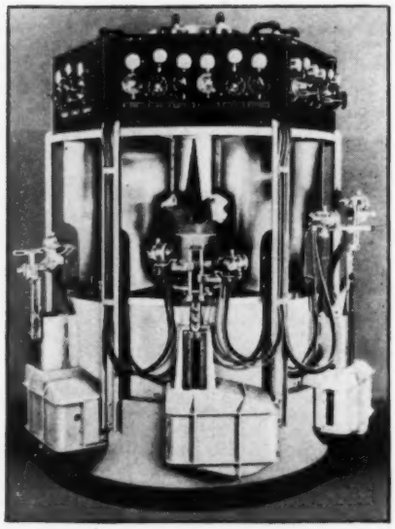
METAL CLEANER—*Quaker Chemical Products Corp., Conshohocken, Pa.* Quasol No. 80 has been developed for removing grease, oil and dirt from all types of metals. Not shown. Vol. 85, p. 1301.

SOLUTION FILTER—*Alsop Engineering Corp., Milldale, Conn.* The "Hy-Speed" line of filter equipment for keeping plating solutions clean uses a "sealed disk" filter. The device is offered in portable pump-equipped types and in larger sizes for permanent installation for continuous filtering. Vol. 85, p. 368.

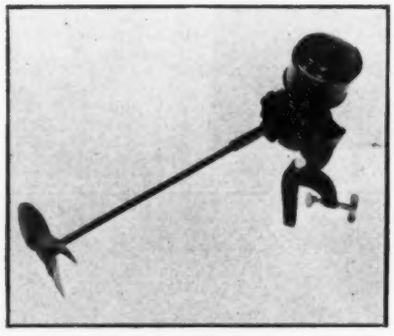




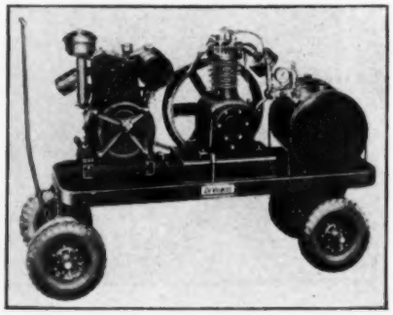
HOSE—*Thermoid Co., Trenton, N. J.* Furnished in lengths of 25, 50 and 500 ft., in ¼, ⅜ and ½-in. sizes, "Thiokol" synthetic rubber hose has been developed for handling paints, varnishes and similar compounds containing strong solvents. Not shown. Vol. 85, p. 576.



AUTOMATIC METALLIZING MACHINE—*U. S. Galvanizing & Plating Equipment Corp., 33 Heyward St., Brooklyn, N. Y. and Metallizing Engineering Co., Inc., 4107 41st Ave., Long Island City, N. Y.* From 30 to 40 complete cylinder assemblies can be coated with aluminum or aluminum alloy per hour with the automatic metallizing machine. Aircraft engine cylinder is loaded at station No. 1 of the machine. It is automatically indexed to Stations 2, 3, 4 and 5 at which spray guns coat the entire unit. Station 6, the final step in the cycle, is for inspection and unloading. Vol. 85, p. 1345.

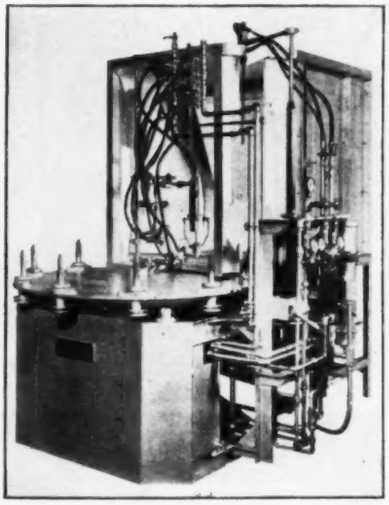


SLOW MIXER—*Eastern Engineering Co., 45 Fox St., New Haven, Conn.* Designed as a portable batch mixer, Type A-2 slowspeed, air powered mixer is particularly adapted for handling heavy materials. The pneumatic motor is rated at 1½ hp. with a maximum speed of 400 r.p.m. on 40 lb. pressure. Vol. 85, p. 946.

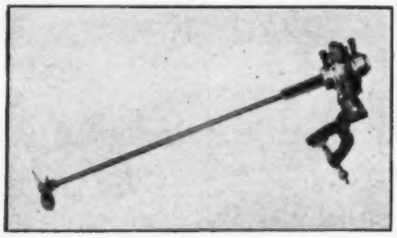


SPRAY PAINTING COMPRESSORS—*De Vilbiss Co., Toledo, Ohio.* For large installations in industrial and maintenance work, this series of 4 and 6 hp. portable spray painting air compressor outfit has been improved. Vol. 85, p. 944.

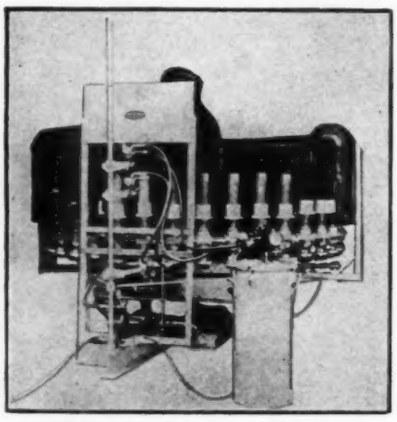
SHELL PAINTING MACHINE—*De-Vilbiss Co., Toledo, Ohio.* A machine which efficiently spray paints both the inside and outside of shell automatically, speeding production and reducing labor requirements, is capable of spraying all shell sizes from 37 to 105 mm. Except for loading and unloading shell on the spindles, operation is completely automatic. Vol. 85, p. 358.

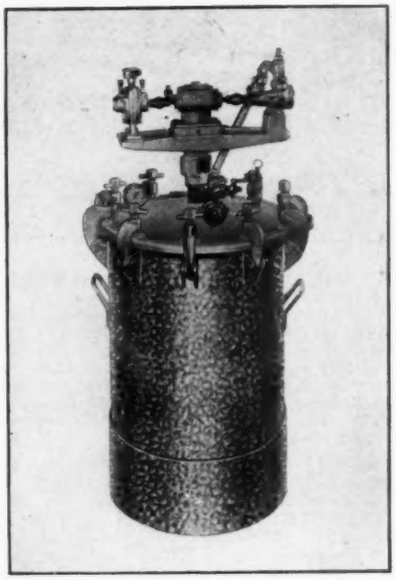


PAINT MIXER—*Eastern Engineering Co., 45 Fox St., New Haven, Conn.* The Type A-1 air mixer will serve as a portable batch mixer for either 50- or 100-gal. containers. It can be operated safely in the presence of serious fire hazards as it is completely inclosed. The air motor is ball bearing, ¼ hp., with a maximum speed of 2,000 r.p.m. on 100 lb. pressure. A 4-in. diameter nickel-plated bronze propeller is used. Vol. 85, p. 142.

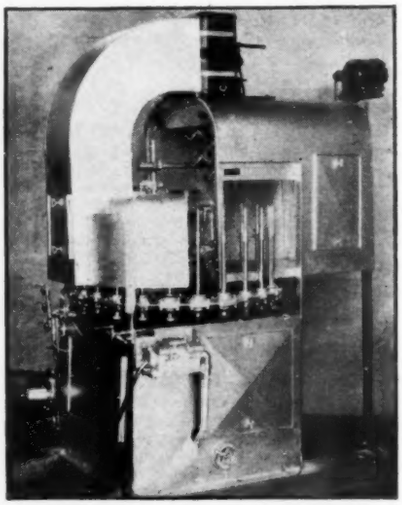


SHELL SPRAY PAINTER—*Eclipse Air Brush Co., 400 Park Ave., Newark, N. J.* Production is approximately 500 per hour when six-minute pyroxylin lacquer is sprayed on projectiles from 37 to 155 mm. This machine consists of a 7-ft. indexing turntable with 36 rotating spindles carrying the shell in front of automatic spray guns. Vol. 85, p. 190.





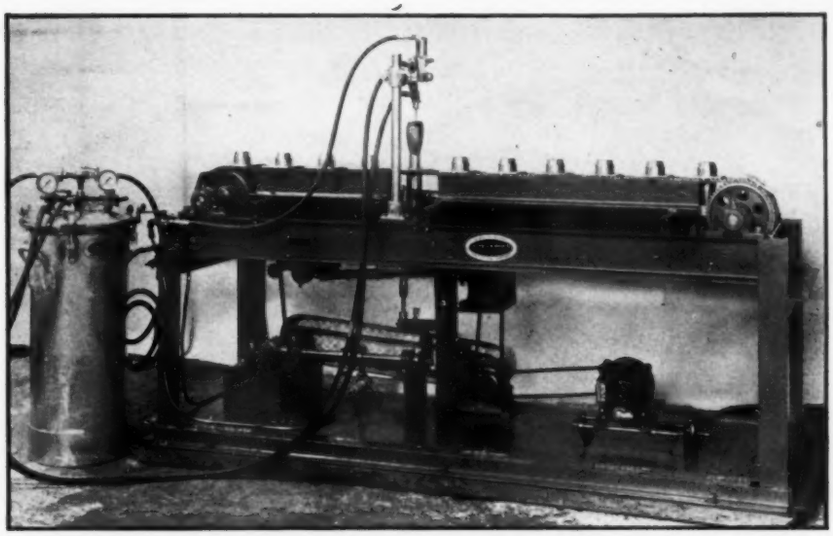
SMALL PAINTING SYSTEMS—*De-Vilbiss Co., Toledo, Ohio.* Three varieties of Type QBM small paint circulating systems are available. System A forces material under air pressure through a loop no longer than 200 ft. System B provides a loop as long as 450 ft., with individual fluid regulator for each gun. With system C the fluid is recirculated through the head of each gun, a practice recommended for materials difficult to keep in suspension. Vol. 85, p. 92.



AUTOMATIC SPRAY MACHINE—*Eclipse Air Brush Co., 400 Park Ave., Newark, N. J.* This automatic spray machine to coat and dry the outside of small shell (20 to 40 mm.), grenades, shot or boosters occupies a floor space 4 × 4 ft. Vol. 85, p. 1290.

PLASTIC FINISHES—*Maas & Waldstein Co., 438 Riverside Ave., Newark, N. J.* Special finishes for plastics simplify many production problems for manufacturers who may desire to turn to plastics because of metal shortages. Not shown. Vol. 85, p. 370.

PLASTIC COATING—*Durez Plastics & Chemicals, Inc., N. Tonawanda, N. Y.* By impregnating porous castings with phenolic resin 7347-A, castings which do not quite hold specified pressures, due to factors beyond the control of the manufacturer, can now be made entirely satisfactory. Not shown. Vol. 85, p. 635.

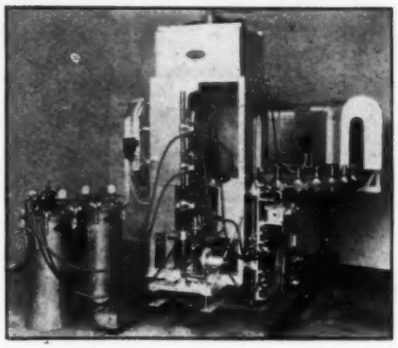


AUTOMATIC SPRAY GUN — *Eclipse Air Brush Co., 400 Park Ave., Newark, N. J.* The timing of this automatic spray machine is so arranged that an even coating is obtained on the insides of trench mortar shell or other objects having a conical interior. Vol. 85, p. 627.

SHELL SPRAY PAINTER — *Eclipse Air Brush Co., 400 Park Ave., Newark, N. J.*—Insides and outsides of projectiles are coated in one operation in a new automatic shell spraying machine. Action of the spray gun is controlled by an electric eye device so that there is no spray unless a shell is in the work holder. Vol. 85, p. 892.

SYNTHETIC ENAMEL—*Maas & Walstein Co., 438 Riverside Ave., Newark, N. J.* "Coprene" enamels have a chlorinated-rubber base. They air-dry dust-free in a few minutes and become hard overnight under normal conditions. Not shown. Vol. 85, p. 42.

PROTECTIVE COMPOUND—*Milburn Co., 1416 W. Baltimore St., Detroit, Mich.* Use of "Ply No. 9", a compound which does not penetrate the skin and is very easy to remove, eliminates damage to precise, highly finished parts from perspiration on workman's hands. Not shown. Vol. 85, p. 143.



IRON AND STEEL BLACKENING—*Alrose Chemical Co., Providence, R. I.* Approximately 30 percent savings are made in cost and treatment time with the Jetal process for blackening iron and steel. Not shown. Vol. 85, p. 1302.

RUSTPROOF FINISH—*Alrose Chemical Co., Providence, R. I.* Any metal that can be copper-plated can be blackened and rustproofed by the new process called Electro-Jetalizing. After preplating with copper, products are immersed in a special electrolytic oxidizing bath for 2 to 5 min. Not shown. Vol. 85, p. 684.

WHITE COATING — *Watson-Standard Co., 225 Galveston Ave., Pittsburgh, Pa.* A heat-resistant white coating for protection of metal objects in use at temperatures up to 500 F. can be applied either by roller coating or by spray. Not shown. Vol. 85, p. 42.

PLASTIC COATING—*Marley Chemical Co., 983 E. Milwaukee, Detroit, Mich.* "Marlox" is a plastic coating of the structural type that may be applied to all types of metals and alloys for doing a tough job, either as a priming coat, or purely for protection against rust and corrosion. Not shown. Vol. 85, p. 524.

SYNTHETIC MILL WHITE—*Sherwin-Williams Co., 101 Prospect Ave. N. W., Cleveland, Ohio.* "Kem Save-Lite", a synthetic mill white, is recommended for plants where unusual conditions require maximum durability, faster drying, and extremely sanitary washable surfaces. Not shown. Vol. 85, p. 133.

METALLIC COATING POWDER — *American Solder & Flux Co., Trenton Ave and Norris St., Philadelphia, Pa.* Brand K Amco metallic coating powder for making repairs to damaged tin coatings is rust resistant and will give thorough protection to underlying iron or steel. Not shown. Vol. 85, p. 1301.

ENAMEL—*Sherwin-Williams Co., Cleveland, Ohio.* A finish known as Kem Machine Tool Enamel cuts hours and even days from the finishing time formerly required on large machine tools and has far greater resistance to cutting compounds. Not shown. Vol. 85, p. 901.

PAINT—*B. F. Goodrich Co., Akron, Ohio.* "Koroplate" paint, to protect metal surfaces against chemical reactions and recommended for service wherever extremely corrosive conditions exist, has a base of "Koroseal," a synthetic material created in the Goodrich laboratories from polyvinyl chloride. At ordinary temperatures it can be either brushed or sprayed, and can be thinned with either brush or spray thinners. It must be used in conjunction with a "Koroseal" primer with similar characteristics. Not shown. Vol. 85, p. 194.

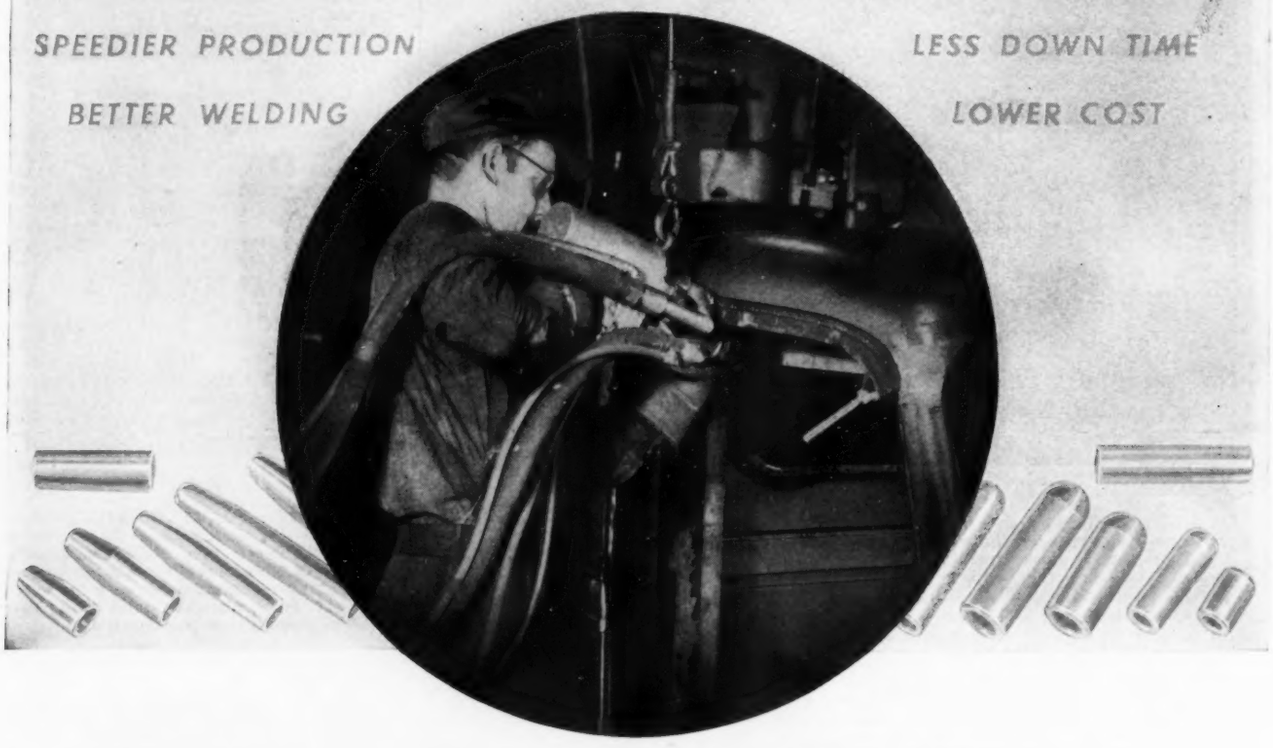
MALLORY STANDARDIZED SPOT WELDING TIPS

SPEEDIER PRODUCTION

LESS DOWN TIME

BETTER WELDING

LOWER COST



The Men Who Man The Guns--

The men who man the high speed spot welding guns behind the front line of defense look to Mallory for long life tips!

These portable guns of production are busy night and day, as welders fabricate large assemblies for trucks, tanks, planes and other metal products needed on the front line. And portable guns assure better, faster welding even in restricted space.

Different jobs demand various types of guns. Some are used to weld inch sections, others for light gauge steels, including stainless, as well as aluminum and other non-ferrous metals.

Whatever the product, whatever the metals to be welded, Mallory has the right tip for the job. Mallory has consistently pioneered in improving resistance welding practice. You can be sure that a Mallory Spot Welding Tip will give you the highest possible production speed . . . the greatest number of welds between redressings . . . the maximum number of spots before replacement is necessary . . . and thus better welding at lower cost.

Particularly important, too, is the fact that Mallory's standardization program assures *prompt shipment* of the tips you need for your job. Specify Mallory now . . . and get the spot welding tips you want when you want them.

MALLORY Resistance Welding Data Book

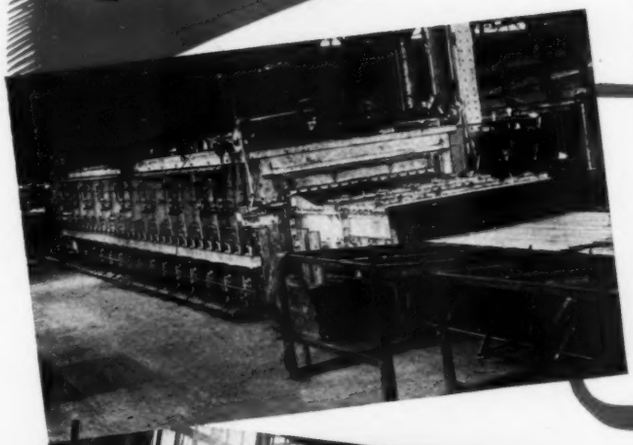
Be sure your engineering files include this factual, complete treatise on resistance welding practices, alloys and specifications. Write for your copy today.

P. R. MALLORY & CO., Inc., INDIANAPOLIS, INDIANA *Cable Address*—PELMALLO

RESISTANCE WELDING P.R. MALLORY & CO. Inc. MALLORY **STANDARDIZED ELECTRODES**

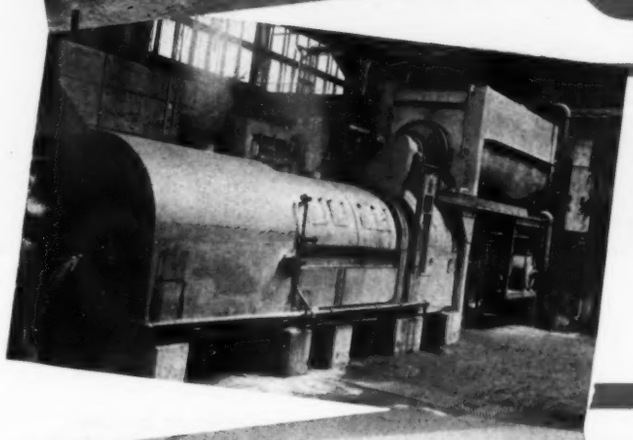
FURNACES THAT SAY IT WITH PRODUCTION

In the heat treatment of shells and other defense products, Rockwell Furnaces speak for themselves. Here are several of the many types that say it—convincingly—in terms of production.



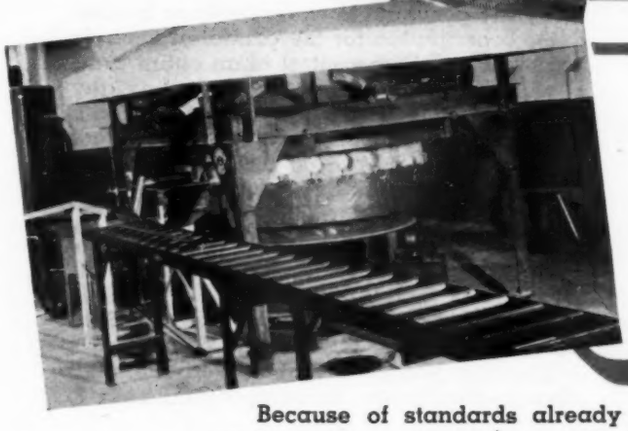
18,000 LBS. PER HOUR

This Gas Fired Roller Hearth Annealing Furnace handles cartridge brass slabs. Construction is unusually rugged—the rolls are extremely heavy, and the drive and all other parts are capable of this extreme production rate. Driven rolls carry the slabs from the charging table through pre-heating, heating and cooling sections, and on the discharge table to the dump mechanism.



3,000 LBS. PER HOUR

A Gas Fired Revolving Annealing Furnace, (Retort Type) that is a complete unit for washing, annealing and pickling 50 caliber brass cartridge cups in a continuous, even stream. A great producer, it is also exceptionally economical from the standpoint of labor, fuel and in the use of acid.



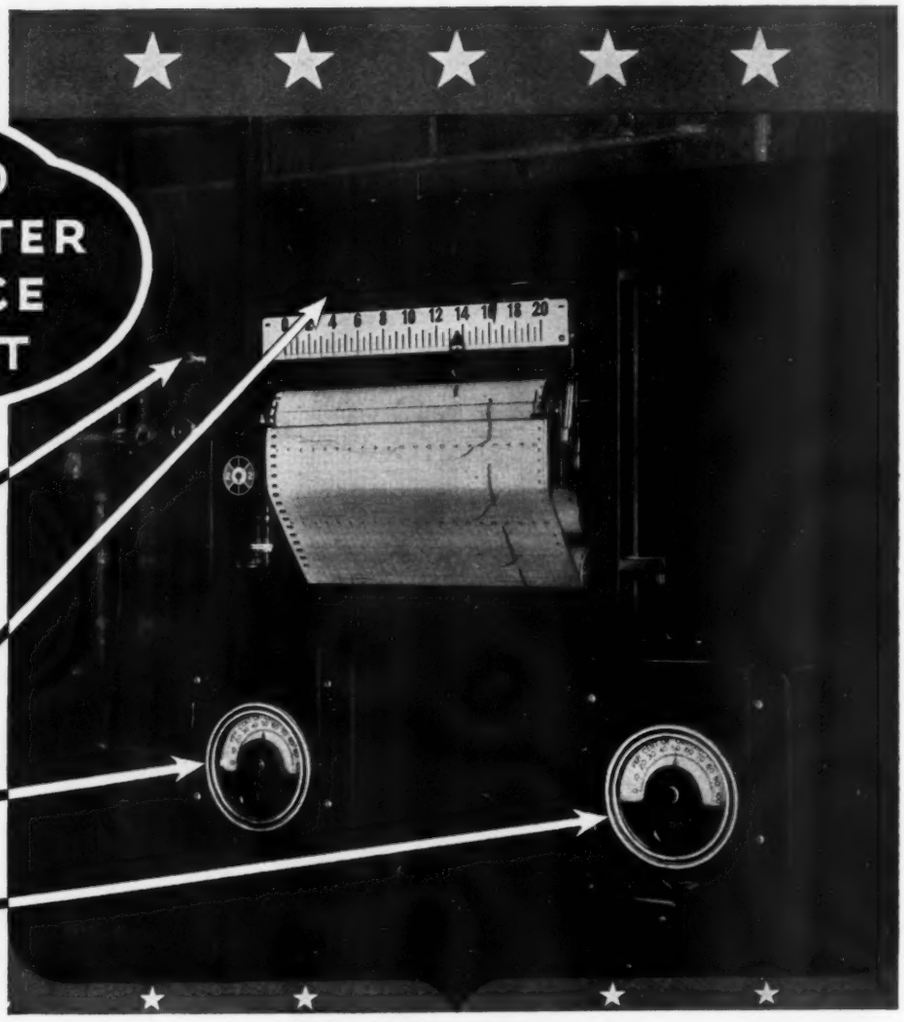
70 SHELLS (4.5") PER HOUR

A Revolving Hearth Type Shell Nosing Furnace with openings around its outside circumference for receiving the shells. Heating is so controlled that no distortion occurs below the taper during the press operation. Charging and discharging from the same position requires only one operator—shells being sent to him on a conveyor. The absence of a water-cooled chill results in a great saving of fuel.

Because of standards already established, time-saving deliveries can be made on many types of Rockwell Furnaces.
What is your heat treating problem?

W. S. ROCKWELL COMPANY
50 CHURCH STREET — ROCKWELL SINCE 1888 BUILT — NEW YORK, N. Y.

HOW TO GET GREATER FURNACE OUTPUT



Set index to desired starting temperature.

Set Soaking Temperature Switch at desired holding temperature.

Set "Rate Control" at desired degrees per hour.

Set "Soaking Time Control" at desired time in hours and minutes.

Upon completion of program, fuel will be shut off and/or signal given.

IN the manufacture of aircraft parts at the Kellett Autogiro Corporation, Philadelphia, *Time* and *Temperature* are important factors in producing desired results.

The Brown Program Potentiometer Controller, shown above, automatically raises, holds or lowers temperatures according to a predetermined Time-Cycle Control schedule. This is accomplished by a timer mechanism operating a motor-driven control index in the instrument. By virtue of the Timer-Control index combination, program flexibility is almost unlimited. The operator merely sets the dials, as in a radio, and fixed cams, etc., are eliminated.

To the steel treater who appreciates the importance of accurate temperature measurement and positive control of furnace operation, Brown Potentiometer Controllers offer worthwhile advantages. They help to speed up and maintain manufacturing schedules along predetermined lines of increased production, standardized quality and lower costs.

They are designed to work singly or in complete coordination for the control of a single factor or complete control of an entire process. They are supplied for controlling any type of furnace . . . oil, gas or electric. You'll find Brown Instruments everywhere, on all makes of furnaces, used for every kind of work where closely held temperature is essential to "all out" production.

Write for Bulletin 85-17. THE BROWN INSTRUMENT COMPANY, 4501 Wayne Ave., Philadelphia, Pa. Offices in all principal cities. Amsterdam-C, Holland: Wijdesteeg 4 —England: Wadsworth Road, Perivale, Middlesex—Stockholm, Sweden: Nybrokajen 7.

BROWN POTENTIOMETER CONTROLLERS

THE BROWN INSTRUMENT COMPANY, PHILADELPHIA, PENNSYLVANIA

DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR CO.

MINNEAPOLIS, MINNESOTA, AND 119 PETER STREET, TORONTO, CANADA

TO MEASURE AND CONTROL IS TO ECONOMIZE

then I said to myself—

This looks like . . .
MORE FOR LESS

We've been more or less successful in our methods—but let's assume we're wrong. Let's get a fresh start and prove each step as right before we take it.

ALTER EGO: Fine exercise to prevent manufacturing ruts. Let's start with the two ways of joining two plates at right angle, say. What's the procedure for method "A"?

It's plain to see we hold the plates with angles and rivets. We must drill or punch holes, fit them up, fill them up with rivets and hammer down the heads of the rivets. This requires 14.85 pounds of connecting material per foot of joint.

ALTER EGO: And in method "B" you just weld a bead along each side of the joint. This joint requires only 8/10 of a pound of connecting material per foot. But look closer, what else do you find?

Here's the big point. To get a load capacity of 70,000 pounds per foot, in the case of "A" we must use ½-inch plate—while in "B" we can use only ⅜-inch plate!

ALTER EGO: Isn't it obvious then that welding gives MORE for LESS. Now, how can we get that for our present work and future plans?

A good starter would be to get those Machine Design Studies which are given out by The Lincoln Electric Company of Cleveland, Ohio, so that we can figure out how arc welding can give us MORE for LESS.

ALTER EGO: Literally, "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

Defense Savings Pay-Roll Allotment Plan

How company heads can help their country, their employees, and themselves

voluntary pay-roll allotment plan | helps workers provide for the future | helps build future buying power | helps defend America today

This is no charity plea. It is a sound business proposition that vitally concerns the present and future welfare of your company, your employees, and yourself.

During the post-war period of readjustment, you may be faced with the unpleasant necessity of turning employees out into a confused and cheerless world. But you, as an employer, can do something *now* to help shape the destinies of your people. Scores of business heads have adopted the Voluntary Pay-roll Allotment Plan as a simple and easy way for every worker in the land to start a *systematic* and *continuous* Defense Bond savings program.

Many benefits . . . present and future. It is more than a sensible step toward reducing the ranks of the post-war needy. It will help spread financial participation in National Defense among all of America's wage earners.

The widespread use of this plan will materially retard inflation. It will "store" part of our pyramiding national income that would otherwise be spent as fast as it's earned, increasing the demand for our diminishing supply of consumer goods.

And don't overlook the immediate benefit . . . money for defense materials, quickly, continuously, *willingly*.

Let's do it the American way! America's talent for working out emergency problems, democratically, is being tested today. As always, we will work it out, without pressure or coercion . . . in that old American way; each businessman strengthening his *own* house; not waiting for his neighbor to do it. That custom has, throughout history, enabled America to get things done *of its own free will*.

In emergencies, America doesn't do things "hit-or-miss." We would get there *eventually* if we just left it to everybody's whim to buy Defense Bonds when they thought of it. But we're a nation of businessmen who understand that the way to get a thing done is to *systematize* the operation. That is why so many employers are getting back of this Voluntary Savings Plan.

Like most efficient systems, it is amazingly simple. All you have to do is offer your employees the convenience of having a fixed sum allotted, from each pay envelope, to the purchase of Defense Bonds. The employer holds these funds in a separate bank account, and delivers a Bond to the employee each time his allotments accumulate to a sufficient amount.

Each employee who chooses to start this savings plan decides for himself the denomination of the Bonds to be purchased and the amount to be allotted from his wages each pay day.

How big does a company have to be? From three employees on up. Size has nothing to do with it. It works equally well in stores, schools, publishing houses, factories, or banks. This whole idea of pay-roll allotment has been evolved by businessmen in cooperation with the Treasury Department. Each organization adopts its own simple, efficient application of the idea in accordance with the needs of its own set-up

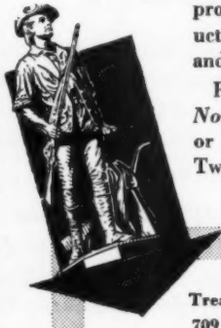
No chore at all. The system is so simple that A. T. & T. uses exactly the same easy card system that is being used by hundreds of companies having fewer than 25 employees! It is simple enough to be handled by a check-mark on a card each pay day.

Plenty of help available. Although this is *your* plan when you put it into effect, the Treasury Department is ready and willing to give you all kinds of help. Local civilian committees in 48 States are set up to have experienced men work with you just as much as you want them to, and no more.

Truly, about all *you* have to do is to indicate your willingness to get your organization started. We will supply most of the necessary material, and no end of help.

The first step is to take a closer look. Sending in the coupon in no way obligates you to install the Plan. It will simply give you a chance to scrutinize the available material and see what other companies are already doing. It will bring you samples of literature explaining the benefits to employees and describing the various denominations of Defense Savings Bonds that can be purchased through the Plan.

Sending the coupon does nothing more than signify that you are anxious to do *something* to help keep your people off relief when defense production sloughs off; *something* to enable *all* wage earners to participate in financing Defense; *something* to provide tomorrow's buying power for your products; *something* to get money *right now* for guns and tanks and planes and ships.



France left it to "hit-or-miss" . . . and *missed*. *Now* is the time for *you* to act! Mail the coupon or write Treasury Department, Section A, 709 Twelfth St. NW., Washington, D. C.

FREE - NO OBLIGATION

Treasury Department, Section A,
709 Twelfth St. NW., Washington, D. C.

Please send me the free kit of material being used by companies that have installed the Voluntary Defense Savings Pay-Roll Allotment Plan.

Name _____

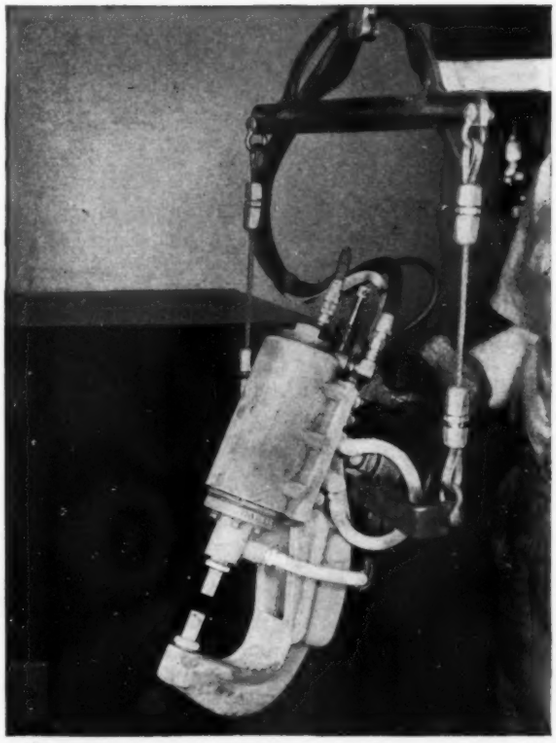
Position _____

Company _____

Address _____

This space contributed by AMERICAN MACHINIST

YOU *Can't* "KEEP 'EM FLYING"



***New** . . . A welding gun for aluminum. For production and tack-welding. Refrigerated, as shown, if desired, to minimize tip cleaning and mushrooming. Gun hanger permits welding in virtually any position.*

. . . *unless* you first get them into the air. To speed airplane production, Progressive—largest producer of welding guns—has developed a portable welding gun designed specifically for the welding of aluminum.

Developed at the request of aircraft manufacturers, the gun will permit welding of parts too large to handle in pedestal welders, as well as quick tack-assembling of small parts, etc., in fixtures.

Designed for operation through virtually any control equipment used for aluminum welding, the gun is available on quick delivery in different yoke types to meet individual requirements, as the result of incorporating all operating mechanisms in an interchangeable gun head.

BRANCH OFFICES

CLEVELAND
Frank Stockton

DAYTON
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MILWAUKEE
K. W. Stroffregen

PHILADELPHIA
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DISTRIBUTORS

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R. C. Neal Co.
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Ducommon Metals & Supply Co.
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845 Memorial Drive, S. E.

MONTREAL
Rudel Machinery Co., Ltd.
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ROCHESTER
R. C. Neal Co.
46 Andrews St.

SAN FRANCISCO
Ducommon Metals & Supply Co.

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TORONTO
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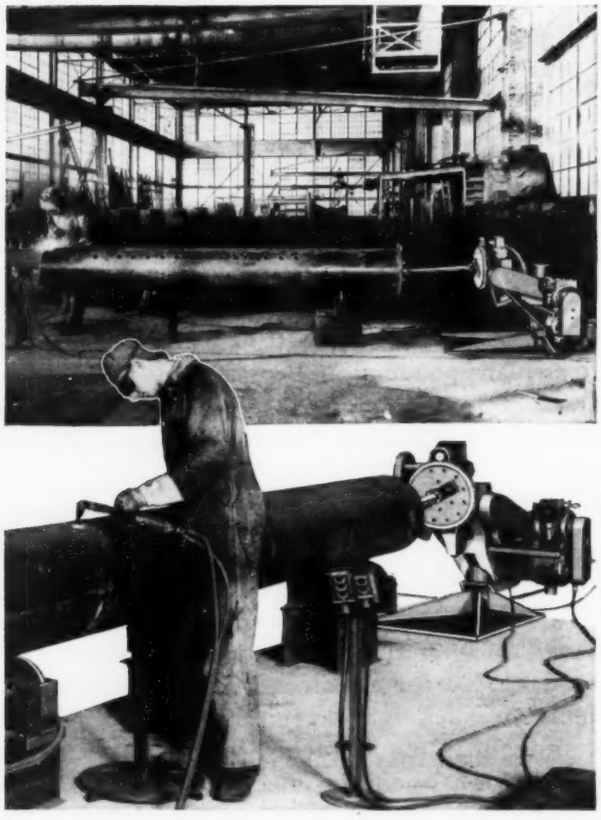
WINDSOR
Rudel Machinery Co.
908 Security Bldg.

PROGRESSIVE WELDER CO.

3001 E. Outer Drive, Detroit, U. S. A.

• Easy work on heavy sections. Turning tubular structures for accurate flame-cutting and welding with controlled speed.

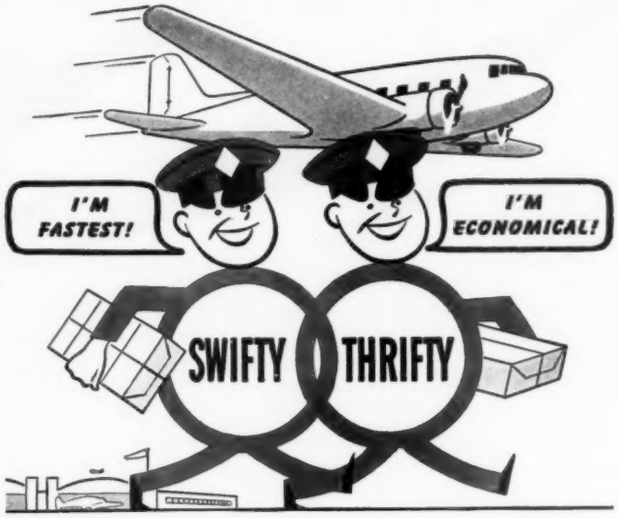
Here is the answer to a tough production problem in handling heavy work of tubular shape that must be cut or welded. The C-F Positioner fixed with a flexible coupling attached to the table, as shown, turns tubing, casings, pipe or similar fabricated products at any pre-determined speed without accurate "lining-up" and with no other equipment than a set of rollers. Handling economy is obvious and faster, better work is the result.



Saving time and labor with *positioned* welds

C-F Welding Positioners are a definite factor in many industries in producing better "down-hand" welding more economically. We would like to send you our booklet which tells why C-F Positioners are so important in this phase of production. Just ask us for a copy of WP 20. There is no obligation.

CULLEN–FRIESTEDT CO.
1313 S. Kilbourn Ave., Chicago, Illinois



"WE FLY WITH EVERY SHIPMENT YOU SEND BY AIR EXPRESS!"

Meet "Swifty" and "Thrifty"—the AIR EXPRESS co-pilots. They always fly together, giving you the "double" advantage of super-speed and economy whenever you send a shipment this FASTEST way. Today, with war emergencies demanding utmost speed and economy, AIR EXPRESS is more vitally necessary than ever. At 3 miles a minute, AIR EXPRESS wings anything from pound-packages to ton-heavy industrial equipment—as far as 2500 miles overnight! The cost? Low AIR EXPRESS rates are even more economical when you consider the valuable hours, days—even weeks saved in shipping time. *Special* pick-up and *special* delivery at no extra charge within regular Railway Express vehicle limits in all cities and principal towns. Find out about it—phone Railway Express, AIR EXPRESS DIVISION.

EXAMPLES OF AIR EXPRESS ECONOMY
(Minimum Charge $1.00. Rates by Air Miles)

Air Miles	1 lb.	3 lbs.	5 lbs.	10 lbs.	25 lbs.
200	$1.00	$1.04	$1.12	$1.32	$2.00
500	1.00	1.28	1.60	2.40	5.00
1000	1.00	1.68	2.40	4.20	10.00
2000	1.00	2.48	4.00	8.00	20.00
3000	1.00	2.88	4.80	9.60	24.00

Proportionately low rates on heavier shipments

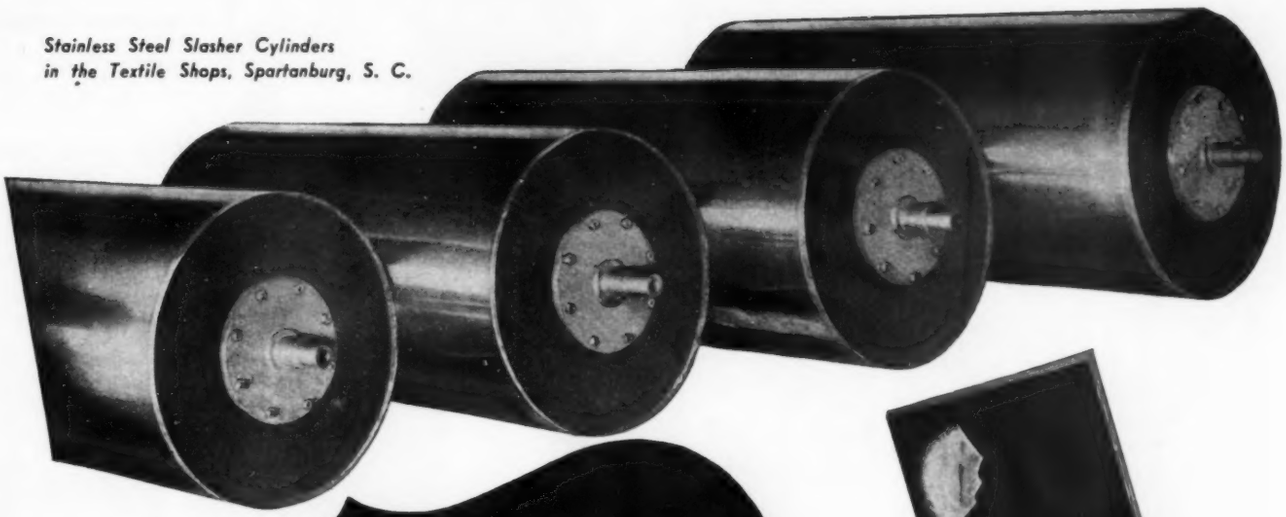
Direct 3-mile-a-minute service between over 370 key cities. Coordinated air-rail connections to 23,000 off-airline points. Also International AIR EXPRESS to and from scores of foreign countries.

'FASTEST WAY' MEANS AIR EXPRESS

AIR EXPRESS

Division of **RAILWAY EXPRESS**

Stainless Steel Slasher Cylinders in the Textile Shops, Spartanburg, S. C.



Page–Allegheny

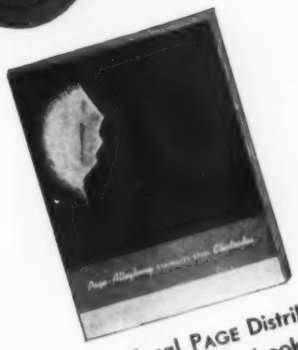
STAINLESS STEEL ELECTRODES for your stainless welding

To make certain, when you weld Stainless, that the metal in the weld equals the metal you are welding, the first step is to tell your local PAGE Distributor the Stainless Analysis. He will provide the correct electrode—made by PAGE in co-operation with the world's largest producer of Stainless Steel.

These PAGE-Allegheny Stainless Steel Electrodes are for shield-arc welding and provide the high speed, low spatter and slag loss and smooth beads you want in all top quality welding. They are suitable for use on horizontal, vertical or overhead jobs.

Ask your local PAGE Distributor for the 12 page booklet on PAGE-Allegheny Electrodes. It contains valuable information to everyone welding Stainless Steel.

PAGE STEEL AND WIRE DIVISION
MONESSEN, PENNSYLVANIA



Ask your local PAGE Distributor for a copy of this booklet.

PAGE HI-TENSILE "F." A shield-arc type electrode for vertical, horizontal or overhead welding.

PAGE HI-TENSILE "C" A shield-arc type electrode for maximum strength, penetration and uniformity—vertical, horizontal or overhead welding.

ACCO TRADE MARK

In Business for Your Safety

PAGE ELECTRODES

PAGE STEEL AND WIRE DIVISION
MONESSEN • PENNSYLVANIA

AMERICAN CHAIN & CABLE COMPANY, Inc. BRIDGEPORT, CONNECTICUT

TRADE **AUTOMATIC** MARK

Manufacturers for Over Thirty Years

Electric Propelled INDUSTRIAL TRUCKS
FOR ECONOMICAL MATERIALS HANDLING

★ FORK TRUCKS
★ LOW & HIGH LIFT TRUCKS
★ LOAD CARRIERS
★ TRACTORS — CRANES

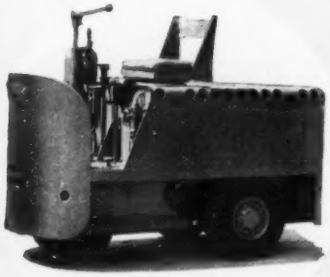
Capacities 1000 to 60,000 Lbs.

WRITE FOR COMPLETE DETAILS

Model "CHTF" — Light-duty fork truck designed expressly for light unit load operation. Capacities 2000 lbs. Has full telescopic fork lift 120"—Collapsed height 83". Exceptionally compact for box car operation and narrow platform or aisle maneuvering.

★ LIFTING
Low Lift Type for Skid Transportation

Model "LO-5"—For heavy-duty top-performance and efficiency to handle 10,000-lb. skid loads. Has standard platform 60" long, 26" wide, 11" high with 5" lift. Speed-O-Matic Drive control. Equa-poised drive and Dynatrol lift units.

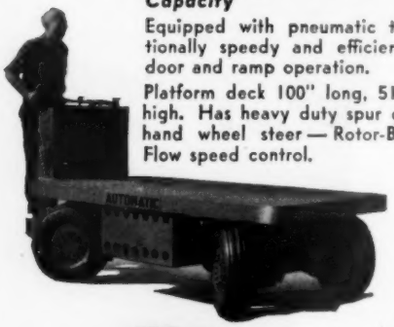


Some of the Popular Types **of the "AUTOMATIC" line are illustrated here. They represent but a part of the many "AUTOMATICS" now serving American industry.**

★ LOADING
Platform Type "EN-2"—4000 lb. Capacity

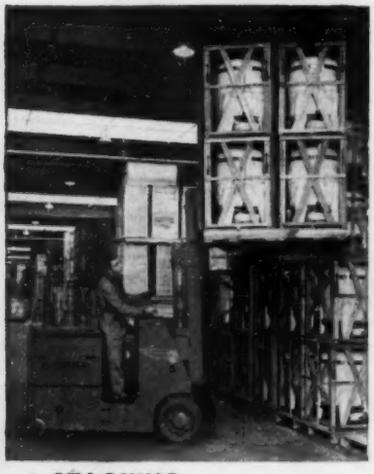
Equipped with pneumatic tires. Exceptionally speedy and efficient. For outdoor and ramp operation.

Platform deck 100" long, 51" wide, 29" high. Has heavy duty spur gear drive—hand wheel steer — Rotor-Brush Power-Flow speed control.



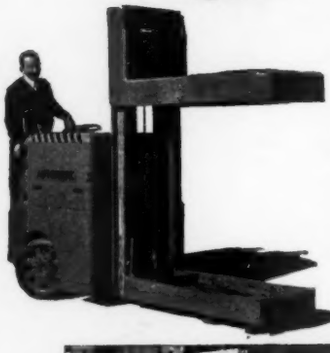
★ HAULING
Model "TNN" Tractor with pneumatic tires. Has powerful spur gear drive, exceptionally compact and easy to maneuver. Rated DBP capacity 485 lbs. normal—2000 lbs. ultimate.

Model "LN-3"—For speedy transportation and placing of 6000-lb. skid loads. Has standard platform 55" long, 27" wide, 10¾" high with 6" lift—Spur gear, drive and lift units—Rotor-Brush control system.



★ TIERING
High Lift Type

Model "TLO-5" — For heavy duty transportation plus tiering of 10,000-lb. capacity skid loads. Has standard platform 60" long, 26¼" wide, 11" high with 60" lift. The very latest in electrical control — construction styling and performance efficiency.



★ STACKING
Model "THTF-L" — Fork truck offers new opportunities for lowest cost unit load handling and storage on pallets. Capacities 3000 to 7000 lbs. Standard telescopic lift 119"—Collapsed height 83" for box car operation.

★ TIERING
Model "TLN-3" — For 6000-lb. skid loads tiering plus transportation. Has standard platform 55" long, 27" wide, 10¾" high, 60" lift.

AUTOMATIC TRANSPORTATION COMPANY
Division of the Yale & Towne Mfg. Co.
59 W. 87th St. CHICAGO, ILL.

WHEN YOU BUY TRUCKS · · *Buy* "AUTOMATIC"

Plant Service Equipment

Power Trucks • Hand Trucks • Cranes and Hoists • Materials Handling Equipment • Drives, Transmissions and Reducers • Hydraulic Pumps and Motors • Belts, Clutches, Couplings and Pillow Blocks • Lighting Equipment • Unit Heaters and Fans • Air Compressors and Cleaners • Drafting and Blueprinting Equipment • Safety Equipment and Supplies • Maintenance Equipment • Miscellaneous Equipment

● AMERICAN MACHINIST'S 29TH ANNUAL BUYERS REFERENCE NUMBER

I NEED *Balance* IN SKATING

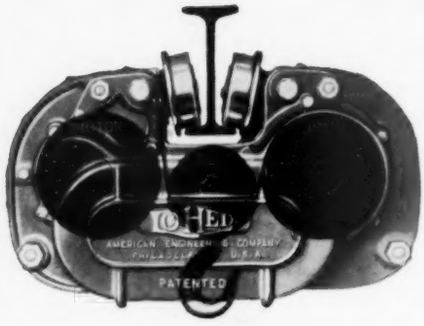
"I NEED BALANCE IN SKATING" says *Bess Ehrhardt*, lovely Star of "Ice Follies of 1941"

AMERICAN ENGINEERING COMPANY

The Lo-Hed Hoist Is Applicable To Any Monorail System There's A Balanced Lo-Hed Electric Hoist For Every Purpose

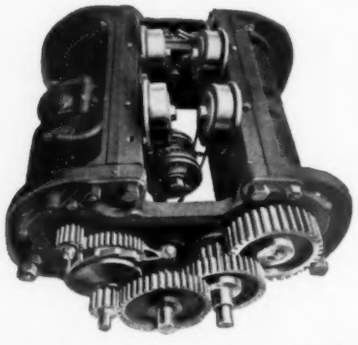
OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, HELE-SHAW FLUID POWER

Look in your Classified Telephone Directory under "A-E-CO LO-HED HOISTS" for your nearest representative.



You Need BALANCE in a HOIST

LO-HED, the *Balanced* Hoist. It's balance that makes the difference between a Lo-Hed and any other hoist. In this different hoist the motor and drum are on opposite sides of the beam. The hook goes up so close to the beam you can scarcely jam your thumb between. You get a compact, balanced hoist, minimum headroom, efficient spur gearing, and a sturdy frame, plus all the practical features a hoist should have. A Lo-Hed is worth a few dollars more but it will make a difference in your operating and maintenance costs. Look at a Lo-Hed and you won't have to look further. Write for Lo-Hed catalog today.



LOOK AT THE BALANCED LO-HED!

It Costs Less To Operate—All gears are efficient stub-tooth spur gears running in a sealed oil bath . . . gear shafts and trolley wheels are equipped with heavy-duty ball or roller bearings.

It Costs Less To Maintain—Sturdy construction . . . seldom, if ever, requires removal from rail . . . covers of controller, motor, drum and gearing are easily removed.

It's Safe—Factor of safety of over 5 at full capacity . . . 100% Positive Automatic Stop when load reaches upper limit . . . Automatic Holding Brake prevents load from drifting when current is shut off . . . short, strong shafts minimize torsional stresses.

It's Protected—Controller is fire, dust and moisture proof . . . motor totally enclosed . . . gearing sealed in . . . motor and drum covered by easily removable covers.

AMERICAN ENGINEERING COMPANY
2407 Aramingo Avenue, Philadelphia

☐ Please send me your complete catalog of LO-HED HOISTS.
☐ Ask your representative to get in touch with me promptly.

Name_____

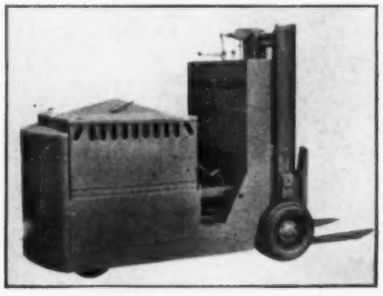
Company_____

Street Address_____

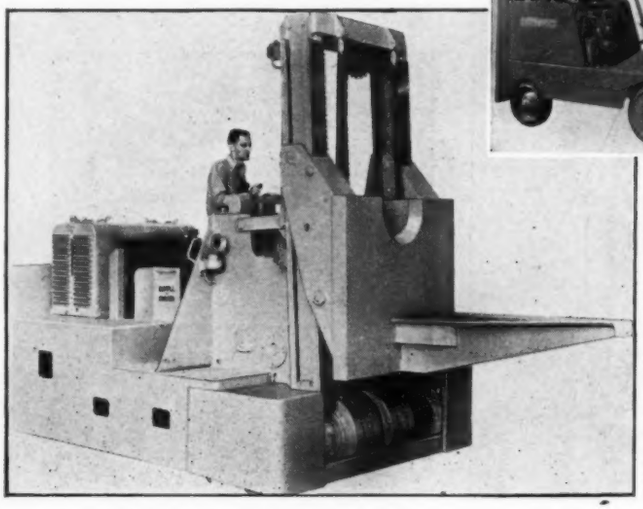
City_____ State_____
(Please print plainly)

PLANT SERVICE EQUIPMENT

LIFT TRUCK—*Baker Industrial Truck Div., Baker-Raulang Co.*, 2168 *W. 25th St., Cleveland, Ohio.* The Type JOM center-control fork truck, available in 2,000 and 3,000-lb. capacities, has been designed for operation in narrow aisles and congested areas. The 2,000-lb. capacity truck is furnished to handle loads up to 60 in. long, and the 3,000-lb. capacity model is furnished for loads up to 42 in. long. Vol. 85, p. 321.



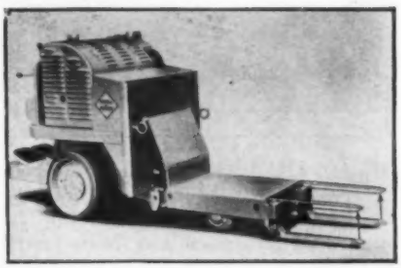
LIFT TRUCK—*Baker Industrial Truck Div., Baker-Raulang Co.*, 2168 *W. 25th St., Cleveland, Ohio.* Ruggedly built to withstand severe usage, this heavy-duty ram and fork truck incorporating full contactor control is rated at 10,000 lb. capacity and is equipped with both 36-in. forks that lift to 60½ in. and a 36-in. ram that lifts to 70 in. Vol. 85, p. 515.



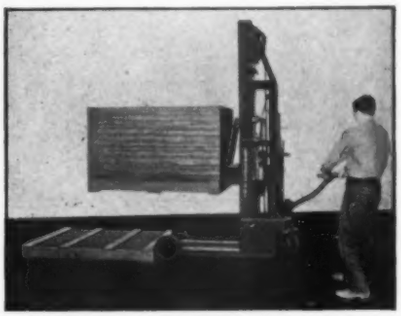
HEAVY-DUTY TRUCK — *Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland, Ohio.* Weight of this ram truck, with rated capacity of 25,000 lb., is completely supported by the articulated driven wheels, causing reduction in dead weight while assuring traction whether loaded or empty. Vol. 85, p. 1244.

LIFT TRUCK—*Towmotor Co.*, 1228 *E. 152nd St., Cleveland, Ohio.* Equipped with low, medium and high telescopic lifts up to 132 in., the Model LT-44 all-purpose lift truck is capable of lifting 4,000 lb. at 15 in. from the carriage. It is also available with interchangeable attachments for special purposes; rams, scoops, flat plates, special loading devices. Vol. 85, p. 511.

LIFT TRUCK—*Towmotor Co.*, 1228 *E. 152nd St., Cleveland, Ohio.* Although there is more room for the driver in the improved Model LT-53 heavy-duty truck, over-all width is but 40 in. and length without forks is only 90 in. Turning radius of 78 in. permits turns in 6½-ft. intersecting aisles. Load carrying capacity is 6,000 lb. Vol. 85, p. 206.



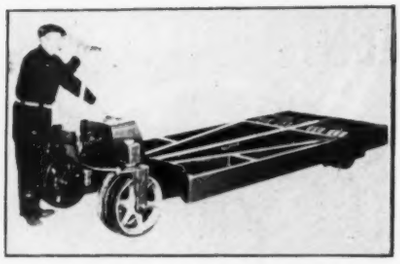
TRUCK PLATFORMS — *Elwell-Parker Electric Co., Cleveland, Ohio.* Special platforms equipped with removable forks are available for standard type low-lift power industrial trucks. When attached in low position, the 30-in. forks lift and transport loaded pallets from floor level, while the same fork extensions when inverted will pick up and transport long skid loads on the truck platform. Vol. 85, p. 522.



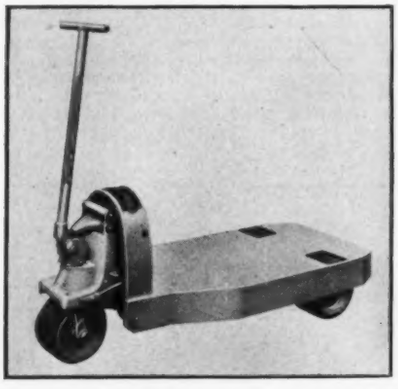
PALLET STACKER — *Lewis-Shepard Sales Corp., 245 Walnut St., Watertown, Mass.* Designed for use in place of large electric or gas operated fork-type tiering trucks, the transporting pallet stacker offers outstanding economies. Over-all height of stacker allows entrance to freight cars and large easy-rolling floor wheels give ample underclearance for sills or ramps. Vol. 85, p. 512.

HAND LIFT TRUCK — *Philadelphia Div., Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.* Easier operation has been made possible by numerous refinements to the "Blue Streak" 2,500-lb. hand lift truck. Either wide or narrow frame is available. Vol. 85, p. 140.

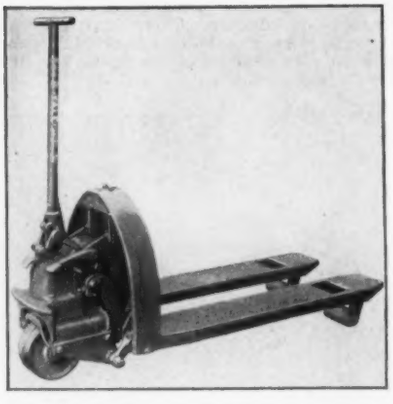
PLANT SERVICE EQUIPMENT—Trucks



HAND LIFT TRUCK—*Lewis-Shepard Sales Corp., 245 Walnut St., Watertown, Mass.* Extra large hydraulic hand-lift trucks in capacities up to 35,000 lb. are arc-welded throughout and rigidly braced in every direction to prevent deflection and weaving. Vol. 85, p. 682.



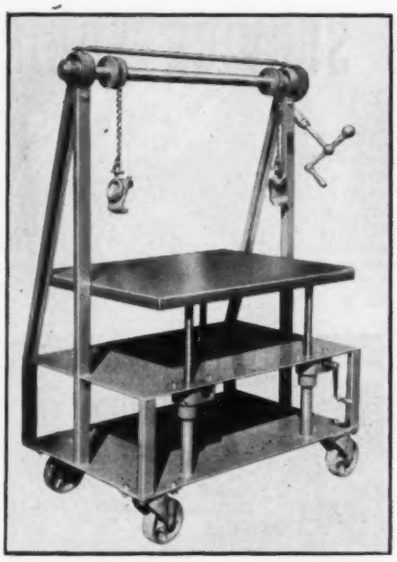
HAND LIFT TRUCK — *Philadelphia Div., Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.* Capacities of 3,500, 5,000, 6,000 and 8,000 lb. are available in the "Load King" hydraulic hand lift truck which features easier lift, easier steer, greater operator safety, reduced maintenance and controlled lowering. Vol. 85, p. 192.



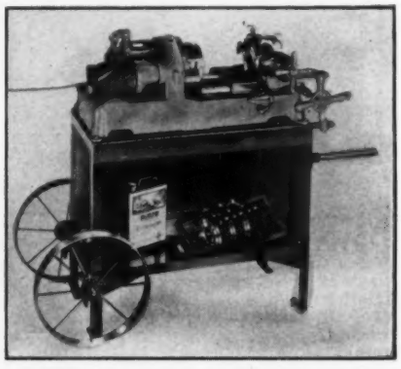
HAND LIFT TRUCK—*Philadelphia Div., Yale & Towne Mfg. Co., 4530 Tacony St., Philadelphia, Pa.* Type Y4RP-9 pallet truck is made in frame widths of 25, 27 and 30 in., and in lengths of 36, 42, 48, 54 and 60 in. in capacities ranging up to 4,000 lb. Vol. 85, p. 87.

→

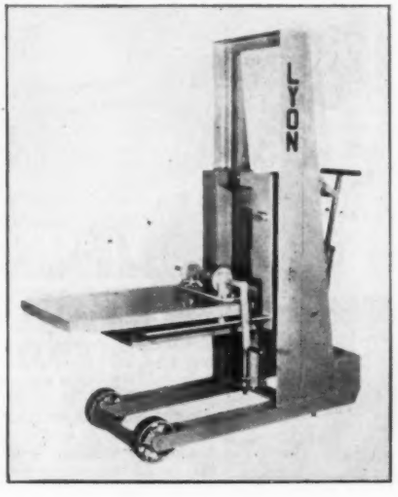
DIE HANDLING TRUCK—*Lyon Iron Works, 678 Madison St., Greene, N. Y.* This hydraulic die handling truck with revolving table arranged to revolve, with stops at each 90 deg., can be furnished in various capacities and specifications, with motor-driven or hand pump. Vol. 85, p. 368.



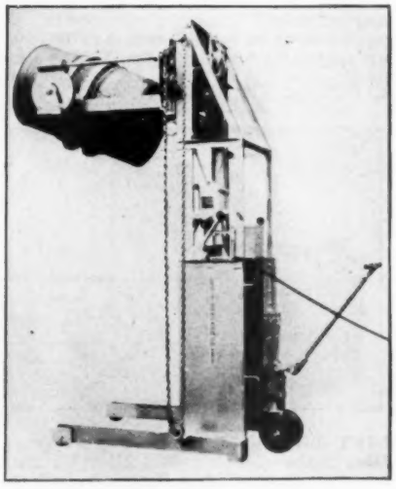
DIE TRUCK—*O. Johnson Mfg. Co., Brookfield, Ill.* Improved "Multiduty" die truck is available in two sizes—the No. B-1 for dies up to 40 in. long and the No. B-2 for dies up to 32 in. long. Vol. 85, p. 36.



PORTABLE CARRIAGES — *Warren Steel Specialties Corp., Warren, Ohio.* Constructed of angle iron, channel, and heavy-gage auto body sheets welded together, this portable carriage has been developed to enable workmen to wheel awkward-to-handle heavy, and lightweight but hitherto stationary, machines direct to the job. Vol. 85, p. 674.

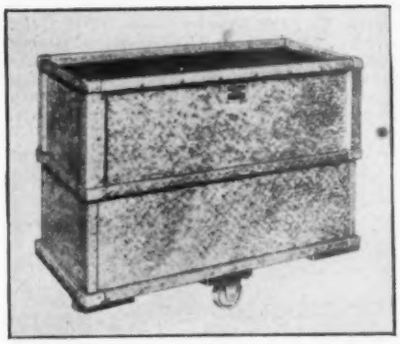


"WHEEL ABOUT"—*Plomb Tool Co., Washington and Santa Fe Aves., Los Angeles, Calif.* Mobile tool cabinet built on the principle of the "add-a-shelf" book case, and on top of which may be mounted the "Master" tool chest, permits moving the complete tool set from job to job. Vol. 85, p. 736.



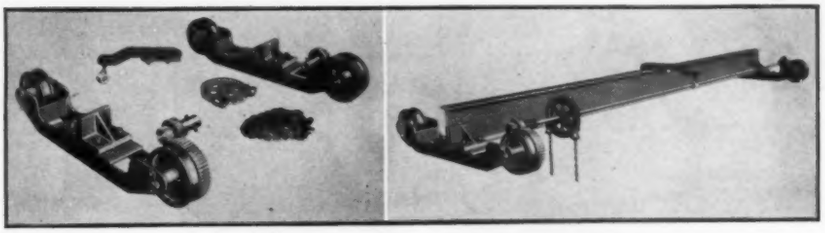
DRUM-DUMPING STACKER—*Lewis-Shepard Sales Corp., 245 Walnut St., Watertown, Mass.* An improved drum-dumping stacker permits control of dumping by the operator from the floor. A self-locking worm makes it possible to hold the drum for as long as desired at any position. Vol. 85, p. 516.

TRANSFER TRUCK — *Lewis-Shepard Sales Corp., 245 Walnut St., Watertown, Mass.* The No. 1917 heavy utility transfer truck is designed to carry heavy storage batteries for electric trucks to the charging board and also suitable for the transfer of dies and similar parts. Capacity of truck is 2,500 lb. Vol. 85, p. 90.

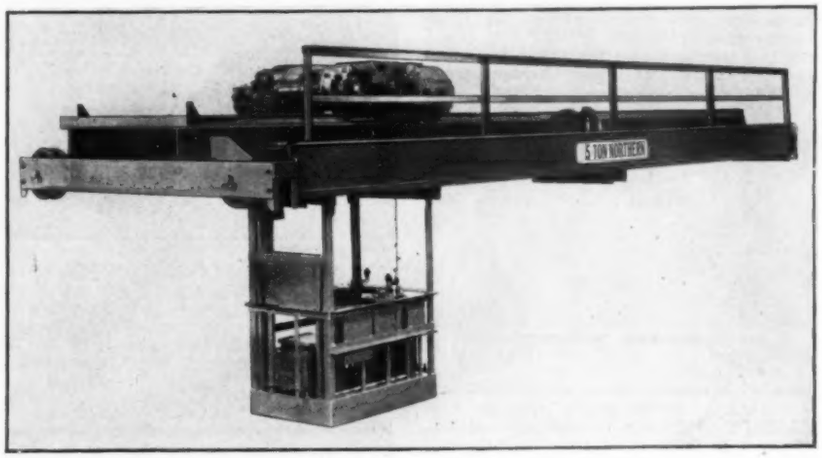


TRUCK—*Spaulding Fibre Co., 484 Broome St., New York, N. Y.* This galvanized steel-clad fiber truck is recommended for use where severe conditions are encountered. Vol. 85, p. 140.

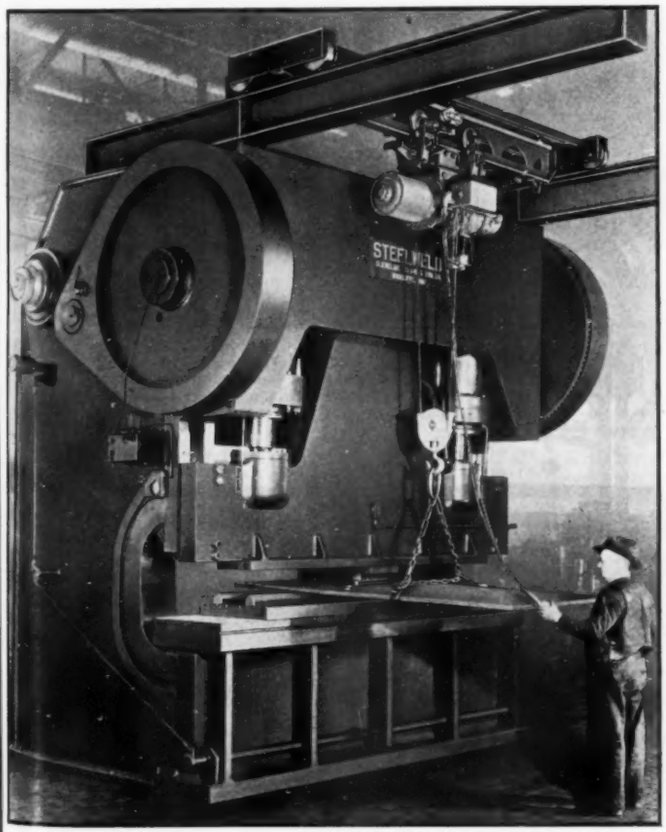
LIFT TABLE—*The Service Caster & Truck Co., 635 N. Brownswood Ave., Albion, Mich.* Capable of many material and tool handling tasks this lift table, with a capacity of 5,000 lb., designed to handle dies, can be used as a feeding table for press work and as a truck for handling batteries. Vol. 85, p. 894.



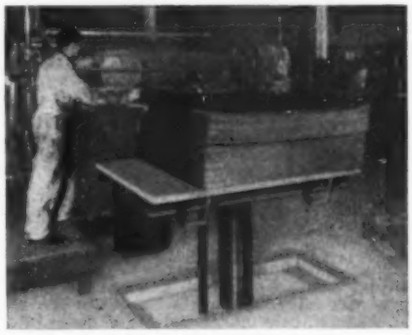
CRANE ASSEMBLIES — *Shaw - Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., Muskegon, Mich.* In less than an hour the bridge crane shown in the right-hand picture can be assembled with the "Budgit" assembly which includes all parts with the exception of the I-beam and the shaft. Swinging bracket jib crane assemblies from which 36 standard sizes of jib cranes can be built and an underhung bridge crane assembly are also available. Vol. 85, p. 136.



CRANES—*Northern Engineering Works, Detroit, Mich.* With welding used extensively, Types S.A. and L.S.A. cranes embody many features of the "Super-Cranes", but provide a more economical installation where service is not extreme and continuous. Vol. 85, p. 511.

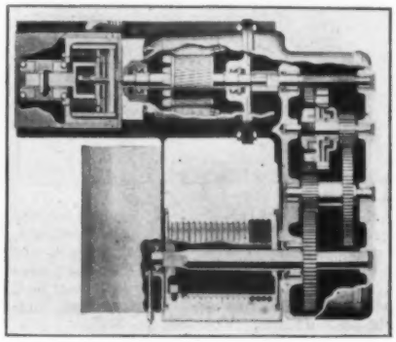


INDIVIDUAL OVERHEAD CRANES — *Steelweld Machinery Div., Cleveland Crane & Engineering Co., Wickliffe, Ohio.* Individual overhead traveling cranes mounted on top of the larger "Steelweld" bending presses, with crane runways extending approximately 8 ft. in front, make it easy for one operator to handle a heavy plate in and out of a machine as well as to support it during press operations. Vol. 85, p. 453.

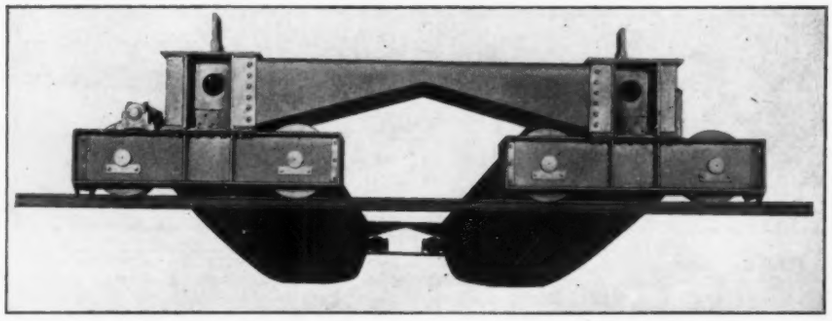


HYDRAULIC LIFT — *Joyce - Cridland Co., Dayton, Ohio.* A simple hydraulic unit is used to provide pressure to the "Materialift" material-handling device suitable for use as a ramp eliminator, machine feed table, loading platform, industrial elevator, etc. Vol. 85, p. 207.

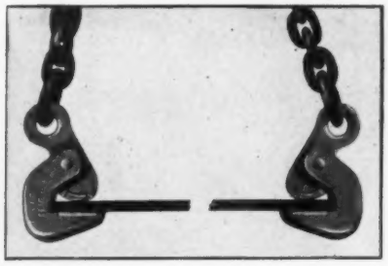
HOIST — *Robbins & Myers, Inc., Springfield, Ohio.* Model F-½ steel hoists of 1,000 and 2,000-lb. capacity provide efficient material handling for all types of industries. These hoists can be applied to any monorail, and motor driven trolleys with speeds of 60 to 100 ft. per min. are available. Vol. 85, p. 942.



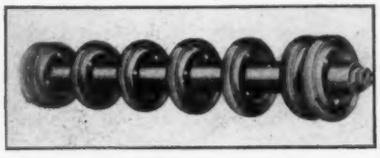
PLANT SERVICE EQUIPMENT—Materials Handling



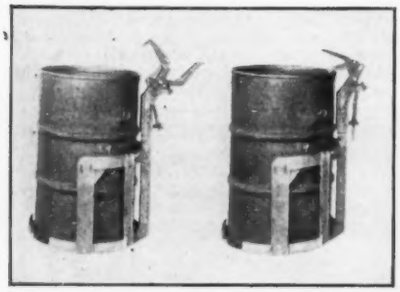
CRANE END TIE—*Cleveland Crane & Engineering Co., Wickliffe, Ohio.* A novel crane and tie which is extremely simple in design has been developed for large heavy-capacity cranes of the type used for powerhouses and for other moderate services requiring eight bridge track wheels. Vol. 85, p. 673.



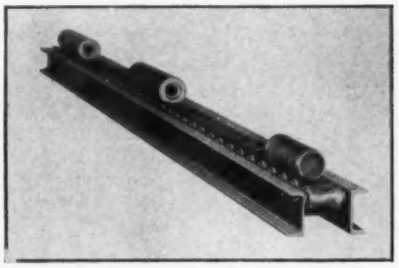
SAFETY CLAMP—*Never-Slip Safety Clamp Co., P. O. Box 448, Grand Central Annex, New York, N. Y.* An improved type of safety lifting clamp, made for either horizontal or vertical lifting of steel plates, sheets or sections, is available in ten styles for handling material weighing up to 10 tons and from ⅛ to 6 in. in thickness. Vol. 85, p. 274.



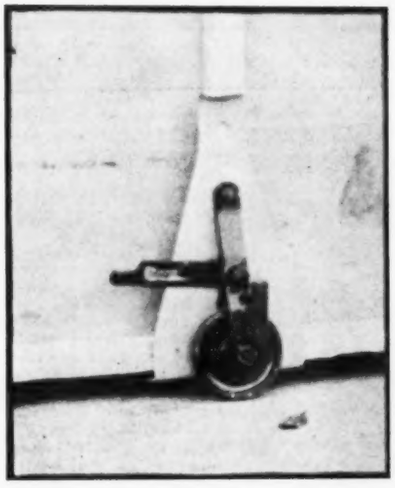
RUBBER-TREAD IDLERS—*Link-Belt Co., 220 S. Belmont Ave., Indianapolis, Ind.* Especially recommended for conveyors handling corrosive, abrasive, wet, or sticky materials, a line of rubber-tread idlers have been developed for supporting the return run of 14 to 60 in. wide belt conveyors. Vol. 85, p. 520.



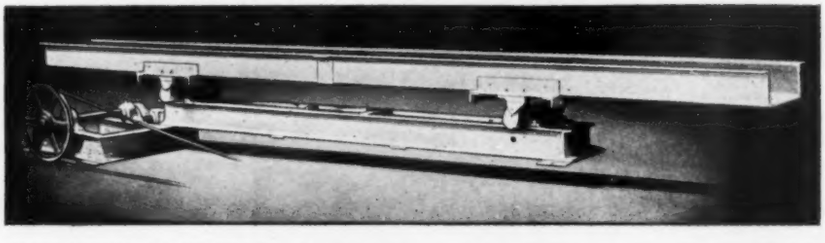
TOGGLE HARNESS — *Lewis-Shepard Sales Corp., 245 Walnut St., Watertown, Mass.* Equipped with a spring toggle, arc welded throughout, supplied for any size of drum, this quick-locking harness will speed up handling and dumping of barrels and drums. Vol. 85, p. 836.



CONCAVE ROLLER CONVEYOR — *Standard Conveyor Co., North St. Paul, Minn.* This concave roller conveyor has been developed for handling shell and other cylindrical objects up to 6 in. in diameter. Rollers are formed from 2¼-in. 10-gage tubing. Vol. 85, p. 522.

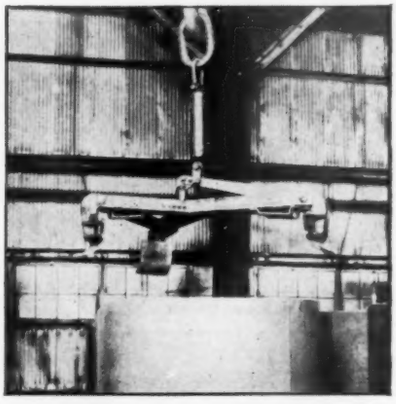


WHEELED JACK—*Airtool Equipment Service, 110 S. Main St., South Bend, Ind.* All types of moderately heavy crated objects and machinery bolted on skids can be easily moved with "Travel Jacks." Vol. 85, p. 40.

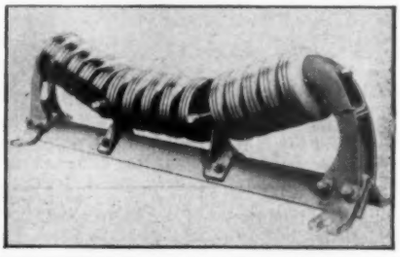


VIBRATIVE CONVEYOR—*Standard Transmission Equipment Co., 416 W. Eighth St., Los Angeles, Calif.* This vibrating conveyor and feeder known as the "Free-Flow" operates on the lift-throw principle, with the motion of the trough designed to minimize wear from abrasion and convey fragile material without breakage. Vol. 85, p. 368.

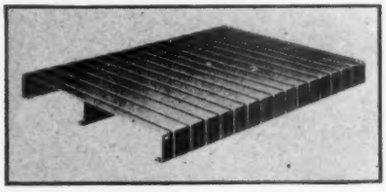
TRUCK CASTERS—*Buffalo Pulley & Caster Co., 182 Breckenridge St., Buffalo, N. Y.* A series of extra-wide rubber casters is available for use where floors must be protected against concentrated loads imposed by narrow steel wheels. Not shown. Vol. 85, p. 323.



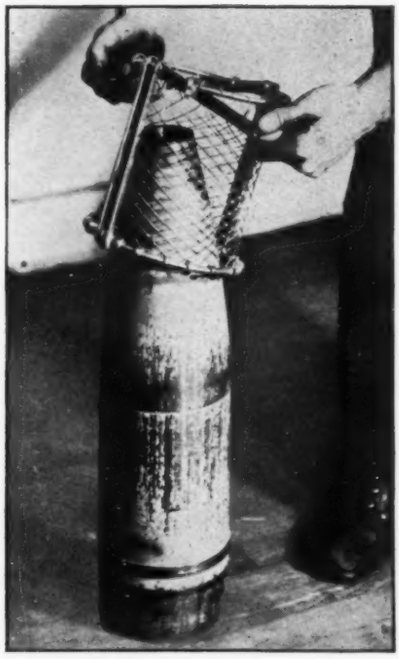
AUTOMATIC TONGS — *Heppenstall Co., Pittsburgh, Pa.* With lifting capacities as high as 200,000 lb., automatic "Safe-T-Tongs" have been developed for a large steel mill to lift annealing covers from stacks of steel coils. Vol. 85, p. 464.



PNEUMATIC CONVEYOR ROLLER—*Stephens-Adamson Mfg. Co., Aurora, Ill.* Style No. 711 pneumatic roller for carriers on belt conveyors has been developed for use wherever shocks or impact are excessive. Vol. 85, p. 520.

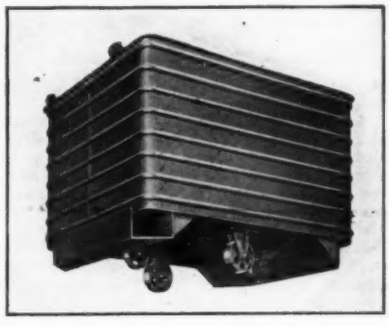


PALLET—*Union Metal Mfg. Co., Canton, Ohio.* Designed for freight handling between customer and consumer, this improved all-steel, light weight single face pallet can be returned with low freight costs. Vol. 85, p. 630.

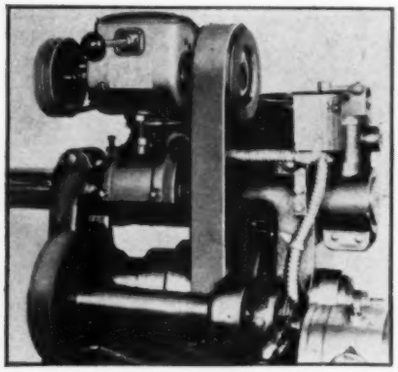


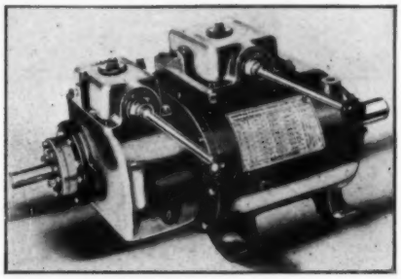
SHELL LIFTERS—*Kellems Co.*, 1911 *Park Ave., New York, N. Y.* Shell lifters of wire mesh for projectiles from 4.7 to 16 in. have rods which forcibly extend the mesh making it possible to grip an object of a smaller diameter than the mesh. Vol. 85, p. 1350.

CONVEYOR TABLE UNITS—*Bruce & Hubbell Engineering Co., 50 School St., Walpole, Mass.* Inexpensive, completely self-contained portable conveyor table units can be shifted to a new location, permitting maximum flexibility to meet changes in assembly practice. Vol. 85, p. 408.

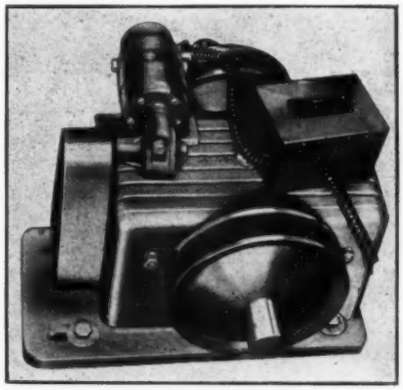


TOOL DRIVE—*Western Manufacturing Co., 3428 Scotten Ave., Detroit, Mich.* The streamlined "Western Master" transmission, designed for use with 1 to 5-hp. motors, is a compact unit with shifting lever moved into main body of the transmission and provision of more positive action. Vol. 85, p. 1118.





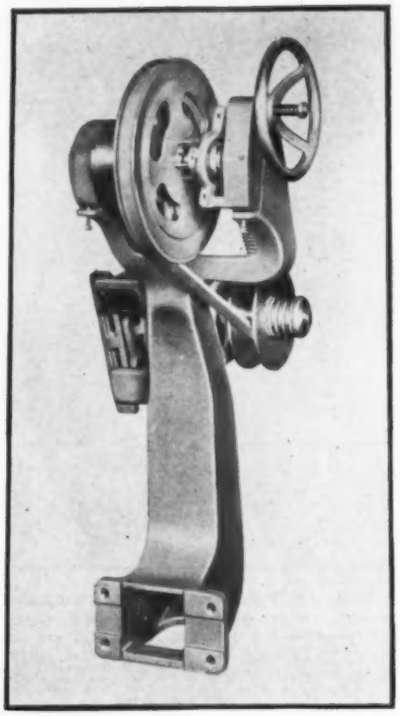
TRANSMISSION—*Western Mfg. Co., 3428 Scotten Ave., Detroit, Mich.* This transmission, with 30 hp. capacity, for motorizing cone driven machine tools has eight changes of speed in geometric progression of 1.29. Maximum reduction 6 to 1. Vol. 85, p. 1296.



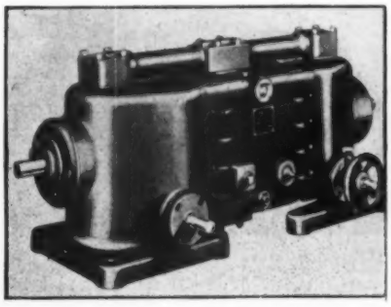
TRANSMISSION CONTROL — *Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* A series of "Select-O-Speed" transmissions equipped with electric motorized control supplement the standard line. A two-button switch controls the speed. Vol. 85, p. 39.

←

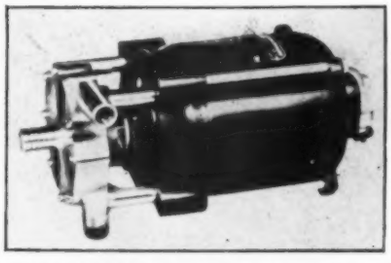
STEEL DUMP BOX—*Union Metal Mfg. Co., Canton, Ohio.* This corrugated steel box, designed for use with lift trucks equipped with revolving type forks, has special fork pockets welded to the bottom at either end running the full length of the box. When forks are inserted in pockets, the box can be lifted, turned completely over for dumping, then righted again. Vol. 85, p. 515.



TOOL DRIVE—*Given Machinery Co., 2020 Santa Fe Ave., Los Angeles, Calif.* The "Vari-Speed" tool drive provides positive variable speeds within a 4:1 ratio and permits instant regulation of spindle speeds to within a fraction of 1 r.p.m. Device is made in sizes from 1 to 5 hp. Vol. 85, p. 138.

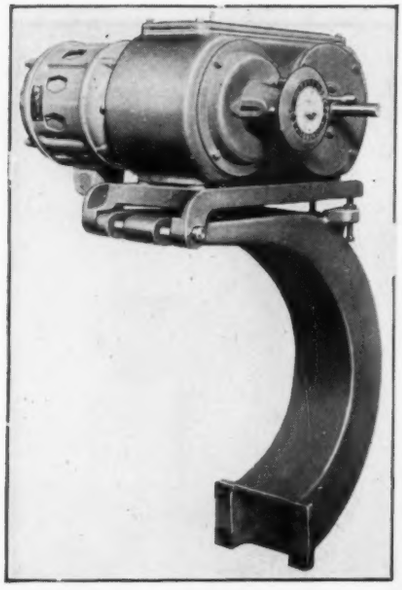


VARIABLE SPEED TRANSMISSION —*Vickers, Inc., 1400 Oakman Blvd., Detroit, Mich.* Designed to operate quietly, efficiently and economically at high pressure, this compact self-contained hydraulic unit for smooth control of rotary power is offered for use as a variable-speed transmission. Vol. 85, p. 314.

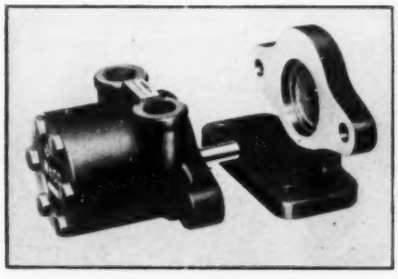


EXPLOSION-PROOF PUMP—*Eastern Engineering Co., 45 Fox St., New Haven, Conn.* The Model D "Midget" explosion-proof pump is used in any industrial application where explosive hazards may exist. It is 10 in. long, 5½ in. high, 5 in. wide and weighs 18 lb. Vol. 85, p. 520.

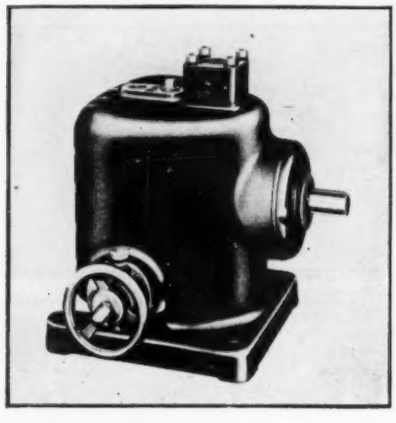
PLANT SERVICE EQUIPMENT—Hydraulic Pumps



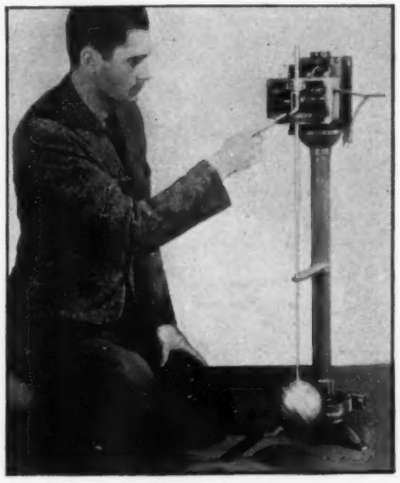
TOOL DRIVE—*Reeves Pulley Co., Columbus, Ind.* Motor and variable units for machine tools are mounted on a pivoting base at the top of a cast semi-steel bracket which can be easily and quickly attached with four cap screws. "Motodrive" capacities are from ¼ to 10 hp. with speed ratios from 2 to 1 or 6 to 1. Using the Vari-Speed motor pulley, capacities range from ¾ to 7½ hp. and cover speed ranges of either 2¾ to 1 or 3 to 1 ratios. Vol. 85, p. 1348.

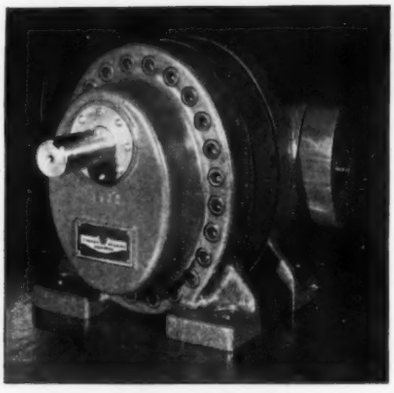


ROTARY GEARED PUMP—*Brown & Sharpe Mfg. Co., Providence, R. I.* Suitable for lubricating, transfer or hydraulic service, the No. 00 rotary geared pump is intended for service where a small flow at pressures up to 100 lb. per sq.in. is needed. It uses helical gears to provide smooth, quiet operation at speeds up to 1,750 r.p.m. Vol. 85, p. 516.

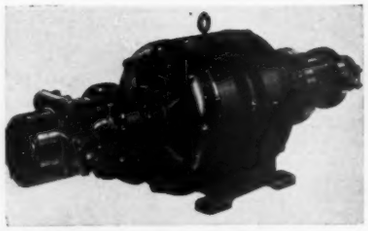


SUMP PUMP—*Eastern Engineering Co., 45 Fox St., New Haven, Conn.* The No. 2 sump pump, having a completely encased toggle switch with a large copper hollow float to assure positive automatic operation, is intended for removal of seepage, overflow, drainage and floodwater from cellars, elevator pits, boiler pits, etc. Vol. 85, p. 518.

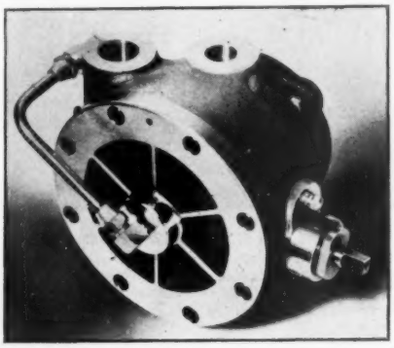




PUMPS AND MOTORS—*Vickers, Inc., 1400 Oakman Blvd., Detroit, Mich.* Designed to operate at standard motor speeds, rotary piston pumps are available in sizes ranging from 3 to 300 gal. per min., and for operating pressures up to 3,000 lb. per sq.in. Available in sizes from 3 to 30 hp., for operation at exceptionally high rotative speeds and at pressures up to 1,500 lb. per sq.in., motors provide a compact unit for development of rotary mechanical power from fluid pressure. Vol. 85, p. 318.

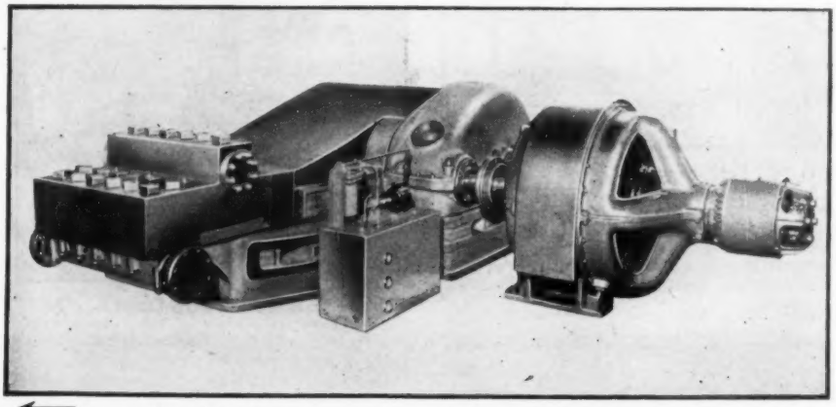


"MOTORPUMP" UNIT—*Vickers, Inc., 1400 Oakman Blvd., Detroit, Mich.* A compact hydraulic power generator is available in the "Motorpump" unit. These units are supplied with both single or double end motors, and with single or multiple pump mounting in sizes ranging from ¾ to 150 hp., in open, splashproof, totally inclosed and explosion proof models. Vol. 85, p. 207.

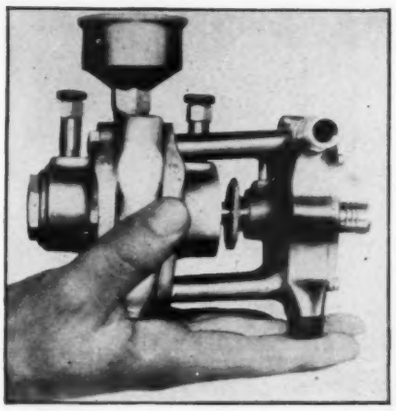


VANE TYPE PUMP—*Detroit Universal Duplicator Co., 249 St. Auburn St., Detroit, Mich.* Delivery is variable over two ranges of 4 to 0 gal. per min. and 8 to 0 gal. per min. with the "Dudco" vane type variable delivery pump. Vol. 85, p. 938.

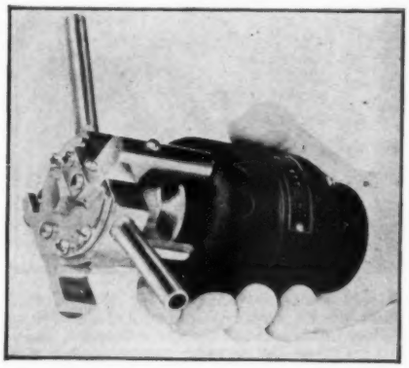
GEAR PUMPS—*Hydro-Power Systems, Inc., Mount Gilead, Ohio.* The Model G-60 constant-delivery type pump is recommended for operation at 1,000 lb. per sq.in. on such applications where peak pressures are momentary; or for operating up to 500 lb. per sq.in. continuous pressures. Vol. 85, p. 568.



HIGH PRESSURE PUMPS—*Baldwin-Southwark Div., Baldwin Locomotive Works, Philadelphia, Pa.* The three piston arrangement in the horizontal Triplex pump provides a 60 deg. overlap in discharge impulses and tends to smooth out pump pulsations. Designed for pressures in excess of 1,000 lb. per sq. in., the pumps are built with 12, 15 and 18 in. stroke lengths. They are designed for direct coupling to 125, 250 and 500 hp. motors respectively. Other capacities are available. Vol. 85, p. 628.

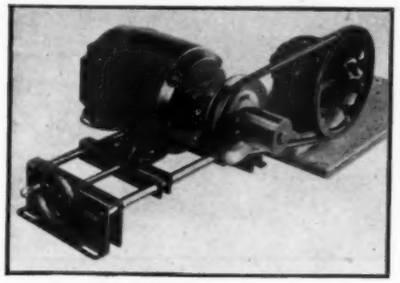


AIR-POWERED PUMP—*Eastern Engineering Co., 45 Fox St., New Haven, Conn.* This midget size, air-powered pump, weighing but 10 lb., for use in industrial, pilot, laboratory and experimental applications, is threaded for ¼ in. pipe fittings. Vol. 85, p. 1002.



PRESSURE PUMP—*Eastern Engineering Co., 45 Fox St., New Haven, Conn.* Model "UT" midget positive pressure pump requires no priming. Maximum pressure is 35 lb. per sq.in. at a maximum volume of 3 gal. per min. Of the rotary type, the pump weighs 3½ lb. and occupies a space 6x3x2½ in. It is driven by a 1/20-hp. 115-volt universal motor. Vol. 85, p. 41.

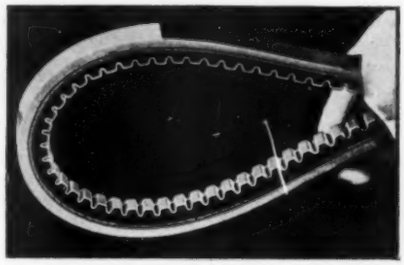
POWER PUMPS—*Worthington Pump & Machinery Corp., Harrison, N. J.* This series of high pressure vertical triplex power pumps in eight sizes for pressures to 9,800 lb. and capacities to 51 g.p.m., are suitable for applications such as hydraulic presses and roll balancing in steel mills. Not shown. Vol. 85, p. 1117.



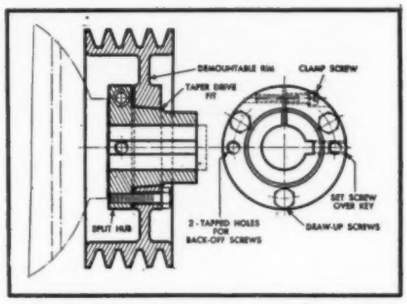
MOTOR PULLEY—*Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* This variable-speed pulley for light, inexpensive machinery mounts directly on the motor shaft and requires only standard V-belts. Speed ratios up to 2 ¾ :1 are available in sizes up to ¾ hp. Vol. 85, p. 414.

LIGHT-WEIGHT BELT—*L. H. Gilmer Co., Tacony, Philadelphia, Pa.* Pliability for use over small pulley diameters and lightness in weight adapt the Gilmer-Hevaloid belt for operation at speeds up to approximately 9,000 ft. per min. Not shown. Vol. 85, p. 575.

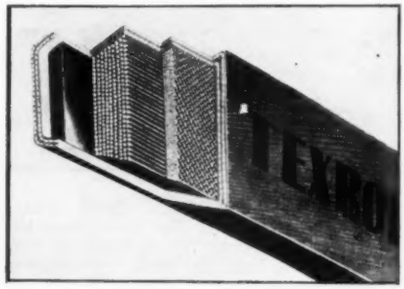
OPEN-END V-BELTING—*B. F. Goodrich Co., Akron, Ohio.* Open-end V-belting is made in maximum 50-ft. lengths, top widths of 21/32, ⅞ and 1¼ in. and in thicknesses of ½, ⅝ and ¾ in. Angle in each case is 40 deg. Not shown. Vol. 85, p. 325.



V-BELTS—*Dayton Rubber Mfg. Co., Dayton, Ohio.* Manufactured in all standard lengths in A, B, C, D and E cross-sections, and in matched sets, the improved Dayton Cog Belt has a new type of cog construction on the inner surface which permits its use on either flat pulleys or V-pulleys. Vol. 85, p. 778.

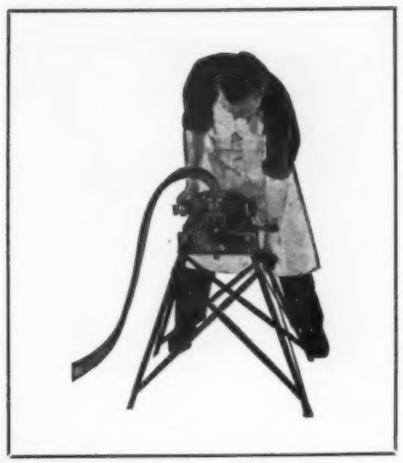


DRIVE SHEAVE—*Worthington Pump & Machinery Corp., Harrison, N. J.* The Type Q-D quick detachable and quick demountable type of V-belt drive sheave has been added to the "Multi-V-Drive" power transmission equipment. Vol. 85, p. 92.



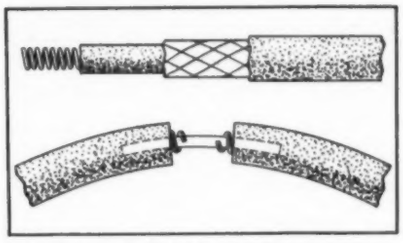
V-BELTS—*Allis-Chalmers Mfg. Co., Milwaukee, Wis.* Cords in "Super 7" Texrope V-belts are smaller, permitting the use of more cords per belt with a resulting greater strength and less stretch. Vol. 85, p. 678.

MULTIPLE V-BELT DRIVES—*Cincinnati Rubber Mfg. Co., Cincinnati, Ohio.* These multiple V-belts developed for a wide power range contribute advantages of smooth running, long life and resistance to fatigue. Not shown. Vol. 85, p. 321.



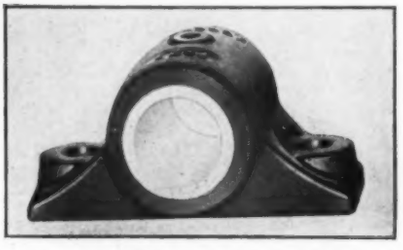
PORTABLE BELT LACER—*Clipper Belt Lacer Co., Grand Rapids, Mich.* Pressures of over 30,000 lb. are exerted by the No. 9 portable belt lacer which will lace one end of any belt up to 6 in. wide, not exceeding ⅜ in. thick, in one operation. Wider belts may be laced by repeating the operation. Vol. 85, p. 416.

FLAT BELTING—*Manheim Mfg. & Belting Co., Manheim, Pa.* "Octopus" flat transmission belting, made in widths from ½ in. with from two to twelve plies, combines great pulley grip with exceptional resilience. It is not recommended for oily drives. Not shown. Vol. 85, p. 275.



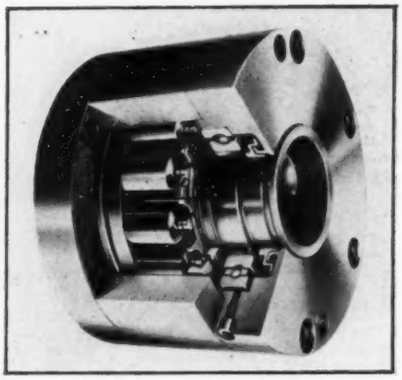
ROUND BELTING—*Sudbury Laboratory, Box 979, South Sudbury, Mass.* Because of a built-in spiral spring core construction, no fasteners are required to join the ends of "Round-Tex" belting. Ends of the belts are joined simply by screwing the spiral spring cores at each end into one another. Vol. 85, p. 92.

PULLEY COVERING—*Nonslip Pulley Covering Co., Buffalo, N. Y.* "Nonslip Rubberpull" is supplied in a liquid form in convenient containers and is readily applied with a brush to the face of any pulley, flat or V-type, to prevent belt slippage. Not shown. Vol. 85, p. 370.

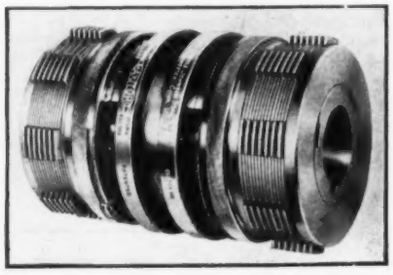


PILLOW BLOCKS—*Jeffrey Mfg. Co., Columbus, Ohio.* Of accurate dimensions, with modern rounded lines and smooth gunmetal finish, the improved solid and split journal bearings have machined bases and faced ends. Vol. 85, p. 780.

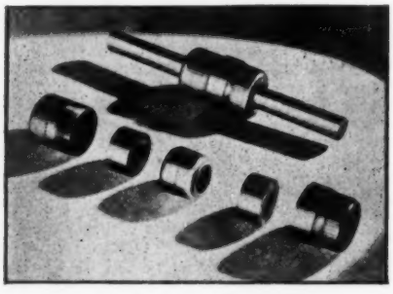
PLANT SERVICE EQUIPMENT—Drive Accessories



INDEXING CLUTCH—*Morse Chain Co., Div. of Borg-Warner Corp., Detroit, Mich.* Available in 12 standard sizes with torque capacities ranging from 26 to 6,300 ft.-lb., the improved indexing clutch is suitable for feeding a variety of sizes of steel, rubber, leather and felt stocks, in round, tubular, square, flat and rectangular shapes. Vol. 85, p. 678.



MULTIPLE DISK CLUTCHES—*Carlyle Johnson Machine Co., 52 Main St., Manchester, Conn.* "Maxitorq" FP single and double multiple disk clutches for machine tool and other installations come in wet plate and dry plate styles. Clutches can be assembled or taken apart without tools. Vol. 85, p. 1072.

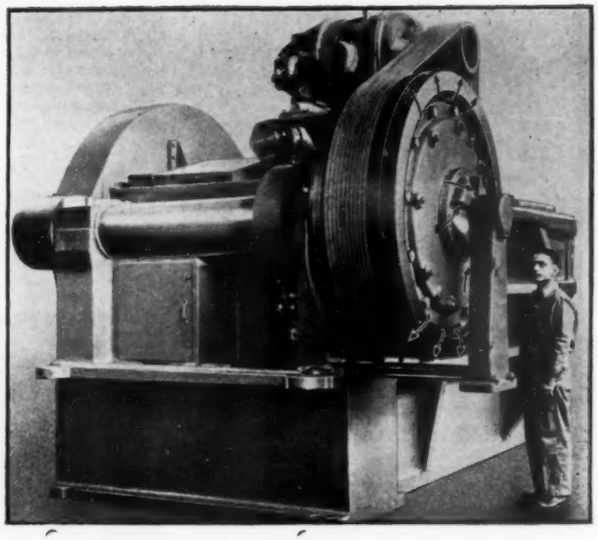


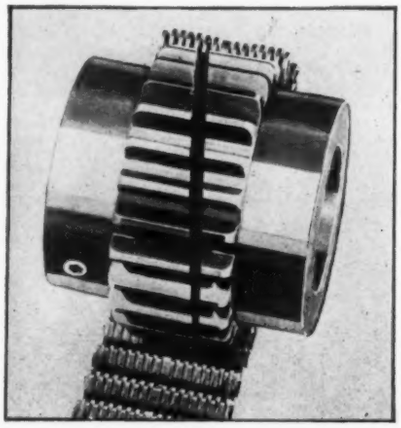
COUPLINGS — *Harris Products Co., 5416 Commonwealth Ave., Detroit, Mich.* This series of six "Torflex" drive shaft couplings, capable of handling any size shafting between ¼ and 1¾ in., need no pins, keys or screws. Each coupling consists of two metal caps, two rubber bushings and a metal spacer. Vol. 85, p. 892.

FLEXIBLE COUPLING — *Lovejoy Flexible Coupling Co., 5009 W. Lake St., Chicago, Ill.* L-R Type HKZ floating-shaft flexible couplings, made in standard sizes with bores from 1½ to 8½ in. (7 to 800 hp. at 100 r.p.m.) for various distances between fixed shafts, are applicable to either horizontal or vertical drives, and are recommended for long distance drives where the space between the drive and the driven units cannot be successfully handled by standard couplings. Vol. 85, p. 516.

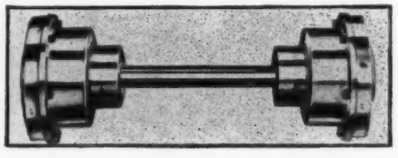
AIRCOOLED CLUTCHES — *The Ajax Mfg. Co., Chardon Rd., Cleveland, Ohio.* Air in great volume is pulled in by scoops at the hub on both sides of the flywheel to cool direct acting clutches on this forging machine. Vol. 85, p. 1242. →

PULLEY COVERING—*Warren Pulley Cover Co., Danielson, Conn.* Suitable for both flat pulleys and V-belt sheaves, this liquid pulley covering is easily applied with a brush, drying quickly and leaving an adhesive surface which is not sticky. Not shown. Vol. 85, p. 325.

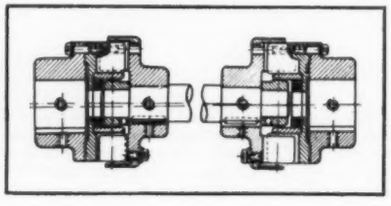


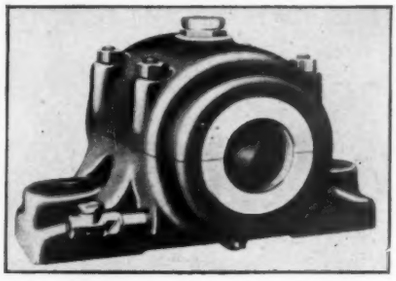


FLEXIBLE COUPLING — *Ramsey Chain Co., Albany, N. Y.* Shearing stresses in pins of chains for flexible couplings are greatly reduced in the Type D diagonally cut flexible chain coupling. One pinion pulls the other through the chain, employing the full tensional strength of the chain's width and resulting in the same characteristics as an ordinary chain drive. Vol. 85, p. 138.



COUPLING—*Falk Corp., 3001 Canal St., Milwaukee, Wis.* The Type P piloted coupling for floating shaft requirements, added to the line of Steelflex couplings, has a low angle universal joint action which eliminates the necessity for an outboard bearing on extended shafts. Vol. 85, p. 997.





PILLOW BLOCKS—*Dodge Mfg. Corp., Mishawaka, Ind.* Water cooled and plain pillow blocks in shaft sizes from 1 7/16 in. to 8 in. have been designed for use where high-grade babbitted bearing is required. Vol. 85, p. 1000.

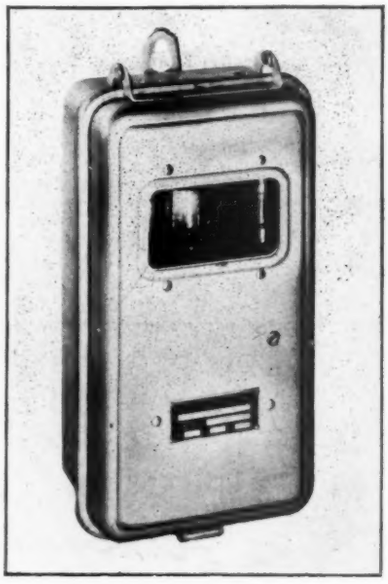
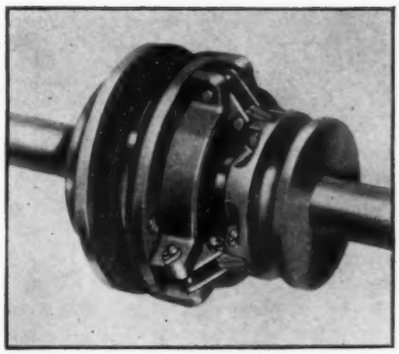
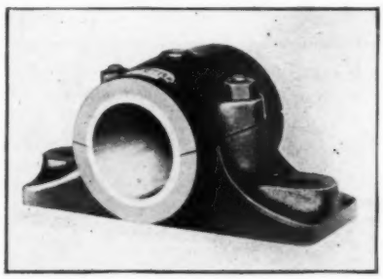


PHOTO-ELECTRIC RELAY — *United Cinephone Corp., Torrington, Conn.* With the "Sun-Switch" photo-electric relay the user chooses the two lighting levels at which he wishes the load switched on and off, and adjusts the calibrated dials to the corresponding foot-candle readings. Operation is entirely automatic, no resetting being necessary. Vol. 85, p. 468.



CLUTCH—*Rockford Drilling Machine Div., Borg-Warner Corp., Rockford, Ill.* Up to 6 hp., at speeds of 600 r.p.m., can be transmitted with the LMC toggle type, overcenter clutch. Vol. 85, p. 514.

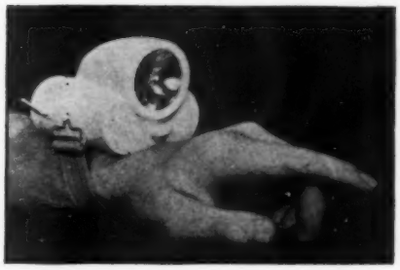


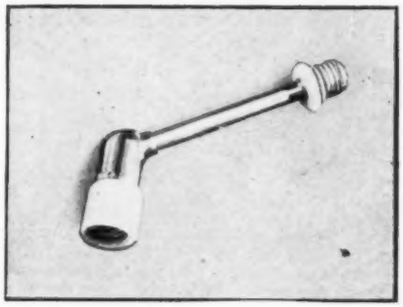
PILLOW BLOCKS—*Link-Belt Co., 2140 W. 18th St., Chicago, Ill.* Designed for moderate speed and power requirements, this streamlined babbitted-bearing common flat box (Series 2–1200), with maroon-colored crackle-finish housing, is available from stock in 24 sizes, for shafts of ½ to 3-in. diameter. Vol. 85, p. 512.

SEARCHLIGHT—*General Electric Co., Schenectady, N. Y.* This completely weatherproof, low cost 18-in. 1,000 to 1,500 watt incandescent searchlight was developed especially for use in protective lighting systems to prevent sabotage. Equipped with high or low pedestal, it can be furnished with either pilot-house or hand control at the factory. Vol. 85, p. 90.

FLUORESCENT LAMPS — *Westinghouse Lamp Div., Bloomfield, N. J.* There are three new Mazda fluorescent lamps available. In addition to the 100-watt Mazda F lamp in the 3,500 F. white, daylight color can be obtained in the 100-watt lamp and the 14-watt Mazda F lamp. The new soft-white color is now available in the 15-watt, 18-in. lamp. Not shown. Vol. 85, p. 144.

FLASHLIGHT—*Flashlight Co. of America, Jersey City, N. J.* The "Rex Ristlite", utilizing two standard flashlight batteries, straps to the wrist to throw light where needed, leaving hands free for work. Vol. 85, p. 632.





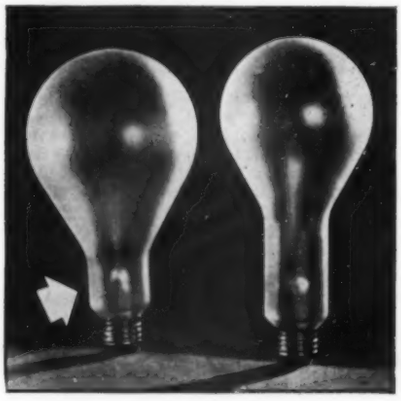
LIGHTING SOCKET—*Reliance Devices Co., Inc., 140 Liberty St., New York, N. Y.* Consisting of the Swivelier socket attached to a tube, this extension socket is adaptable to any lighting conditions where full angular adjustability is required. Vol. 85, p. 678.

REFLECTOR—*Holophane Co., 342 Madison Ave., New York, N. Y.* Designed for use with a 400-watt mercury vapor lamp, the No. 645-AL "Lobay" reflector combines the reflecting efficiency of prismatic glass with accurate directional control of light. Vol. 85, p. 322.

FLUORESCENT FIXTURES — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* A fluorescent fixture employing two 100-watt fluorescent lamps is available for operation on 110–125, 190–216, and 220–250 volts, 60 cycles, a.c. Two types are available: the direct type which throws all light downward, and the diffuser type which allows some of the upward light to pass through apertures above each lamp to reduce contrast between the lighted area and the ceiling. Not shown. Vol. 85, p. 142.

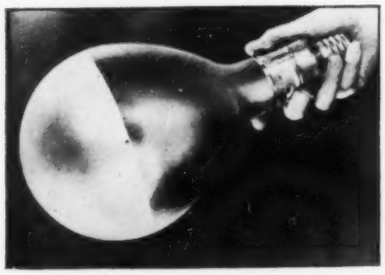
LAMP—*Wabash Appliance Corp., 335 Carroll St., Brooklyn, N. Y.* Made in four sizes and four separate voltages, from 100 to 300 watts, and 110 to 125 volts, the Birdseye "Floodlite" delivers a concentrated flood of light in a medium beam. For localized lighting to supplement general illumination, a detachable swivel socket focuses the light where needed. Vol. 85, p. 462.

FLOODLIGHT BULB—*Wabash Appliance Corp., 335 Carroll St., Brooklyn, N. Y.* This high-power floodlight bulb, designed for high bay lighting in industrial plants with high ceilings, delivers a concentrated flood of light that cuts through distance, haze and smoke to provide brilliant illumination. Bulb is lined with pure polished silver to form a permanently brilliant reflector. Twelve sizes up to 1,500 watts are available. Vol. 85, p. 1352.



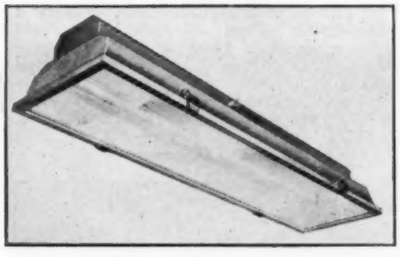
LAMP—*Wabash Appliance Corp., 335 Carroll St., Brooklyn, N. Y.* The construction of this lamp protects the filament from vibration and jar. It is made in 100, 150 and 200 watt sizes in five voltages from 110 to 130 volts, and in four voltages from 220 to 250 volts. Standard finish is either inside frosted or clear. Average burning life is 1,000 hours. Vol. 85, p. 518.

PLANT SERVICE EQUIPMENT—Lighting Equipment

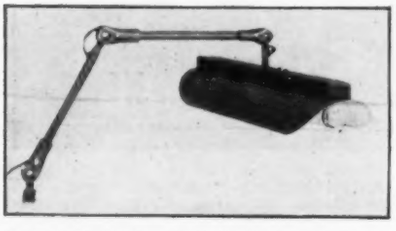


HIGH-VOLTAGE LAMP—*Wabash Appliance Corp., 335 Carroll St., Brooklyn, N. Y.* A Birdseye high-voltage lamp, made with its own built-in reflector unit in the form of a solid silver lining hermetically sealed inside the bulb, is available in six sizes from 100 to 1,000 watts, and in seven different high voltages from 220 up to 300 volts. Vol. 85, p. 572.

TUBULAR LAMP—*Wabash Appliance Corp., 335 Carroll St., Brookyln, N. Y.* The "sealed-silver" Birdseye tubular lamp which fits into a T6½ tubular bulb ¾ in. in diameter and 5 in. long, has an intermediate base and comes in 15-, 20- and 40-watt sizes, all in the one bulb size, and has an average burning life of 1,000 hours. Vol. 85, p. 518.

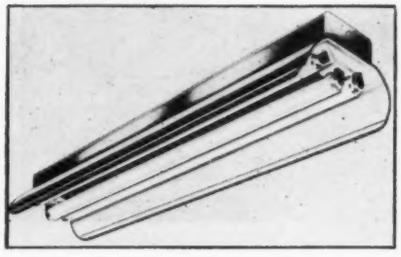


LUMINAIRE—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Type FPS-40 Luminaire, using two or three 40-watt fluorescent lamps, provides lighting intensities from 30 to 100 foot-candles. Vol. 85, p. 1296.



FLUORESCENT FIXTURE—*Fostoria Pressed Steel Corp., Fostoria, Ohio.* Employing a small portable tube of either the 15 or 20 watt size, the No. 600 series of fluorescent lighting fixtures use pivoted arms to locate a shielded tube at point where light is desired. Vol. 85, p. 142.

FLUORESCENT UNITS — *Benjamin Electric Mfg. Co., Des Plaines, Ill.* Unbroken lines of light, row on row across the entire ceiling, provide higher levels of illumination at lower cost with the "Lite-Line" fluorescent lighting system. Not shown. Vol. 85, p. 466.



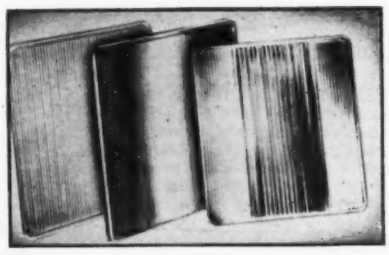
FLUORESCENT FIXTURES — *Day-Brite Lighting, Inc., 5411 Bulwer Ave., St. Louis, Mo.* The "Three-Forty" industrial fluorescent fixture to accommodate three 48-in., 40-watt fluorescent lamps is made for either chain or pipe suspension. The hinged top swings open to make all parts accessible. Vol. 85, p. 1294.

FLUORESCENT LIGHTING UNIT—*Fostoria Pressed Steel Corp., Fostoria, Ohio.* The Model MF-240-N fluorescent lighting unit has been equipped with instantaneous starting. Reflecting surfaces offered are matte-white and gloss white enamel. Not shown. Vol. 85, p. 1002.

LAMP STARTER—*Hygrade Sylvania Corp., Salem, Mass.* "Mirastat" No. 2 for 14 and 20 watt fluorescent lamps, No. 4 for 30 and 40 watt lamps, and No. 6 for 100 watt lamps, are three sizes of improved fluorescent lamp starters available. Not shown. Vol. 85, p. 38.

FLUORESCENT UNIT — *Benjamin Electric Mfg. Co., 120–128 S. Benjamin St., Des Plaines, Ill.* The "Stream-Flo 60" fluorescent lighting fixture is available with a series of apertures located in the top of the reflector to improve ceiling illumination and reduce excessive wear. Not shown. Vol. 85, p. 141.

FLUORESCENT UNIT—*Hygrade Sylvania Corp., Salem, Mass.* Two 100-watt fluorescent lamps are used in the F-235 "Miralum" fluorescent unit designed to bring large quantities of light to aid working efficiency in industrial plants. Not shown. Vol. 85, p. 575.



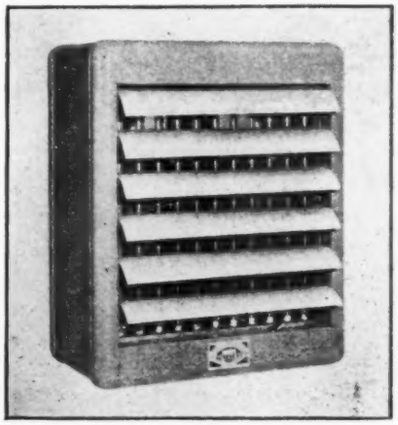
PRISMATIC GLASS LENSES—*Holophane Co., 342 Madison Ave., New York, N. Y.* For controlling fluorescent lighting the "Intensive Controlens" produces the distribution of light most commonly used in both commercial and industrial interiors, the "Concentrating Controlens" produces a confined focusing type of light distribution and the "Extensive Controlens" is particularly adaptable for lighting of vertical surfaces or in low ceiling areas. Vol. 85, p. 570.

MAN-COOLING FAN — *ILG Electric Ventilating Co., 2850 N. Crawford Ave., Chicago, Ill.* This 36-in. heavy-duty portable floor fan, which hurls a 90-ft. blast of air in a straight line, can be placed anywhere, affording a practical means of relief to workmen in areas of intense heat. Other models, with the same general features but not of extra-heavy construction, are available in sizes of 36, 30, 24, and 12 in. Vol. 85, p. 516.

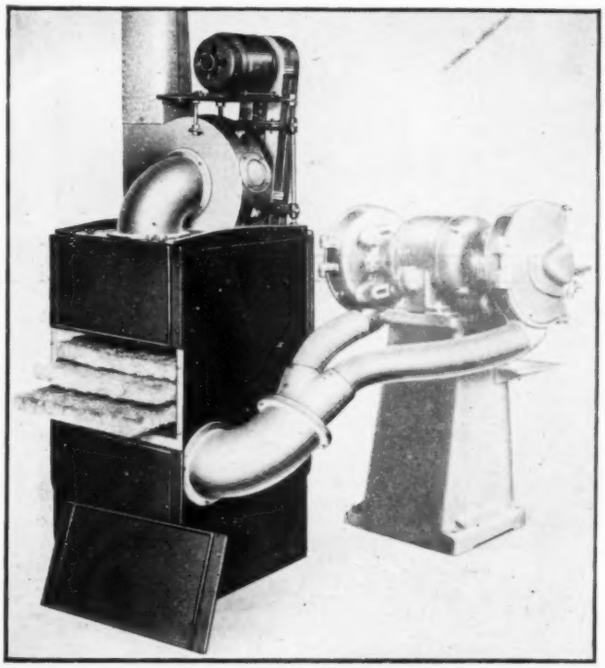
UNIT HEATERS—*Reznor Mfg. Co., 108 James St., Mercer, Pa.* Three types of gas-fired unit heaters, needing no water or steam for operation, are each available in five sizes to provide from 55,000 to 200,000 Btu. per hr. Heaters are equipped with automatic controls and can be furnished to burn natural, manufactured or liquefied petroleum gas. Vol. 85, p. 36.

DUST COLLECTORS—*Pangborn Corp., Hagerstown, Md.* Unit type dust collectors in four sizes, taking one, two, three or four banks of 18 screen each, are identical except for size. Dust laden air enters the casing below the screen. It strikes a baffle plate which reduces velocity to such an extent that coarser dust particles drop directly to the hoppers. Where headroom is limited, hoppers may be replaced by a float bottom dust box with clean-out door. Not shown. Vol. 85, p. 1300.

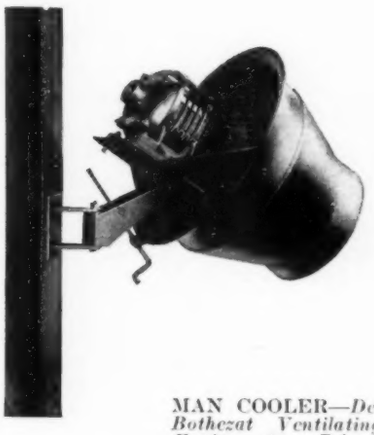
ELECTRIC UNIT HEATER—*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Outputs of 7,000, 10,000 and 14,000 Btu. per hour are delivered by this fan-type all-electric unit heater. Consuming 2, 3, and 4 kw. respectively on either 115 or 230 volts a.c., these units have a swivel bracket designed for both vertical and horizontal adjustment. Vol. 85, p. 322.



UNIT HEATERS — *Autovent Fan & Blower Co., Chicago, Ill.* This completely redesigned line of steam unit heaters employs Series 31 Autovent non-overloading fan wheels. Coils are tested at 500 lb. hydrostatic pressure and provide efficient heating at any steam pressure from 2 to 150 lb. Vol. 85, p. 190.

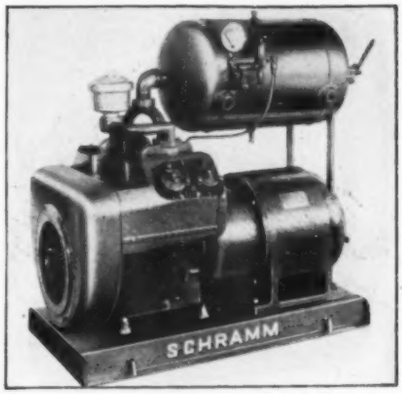


BLOWER FAN WHEELS—*Trane Co., La Crosse, Wis.* Type FC fan wheels, of the forward curved, multi-blade type, developed to conserve space, lessen power requirements, eliminate noise, and deliver full capacity at lowest speed, are available in single and double widths, in sizes ranging from 4½ in. wheel diameter to 60 in. Type BI wheels have twelve backwardly inclined blades with a specially formed rim and range from 15 to 66 in. Vol. 85, p. 412.

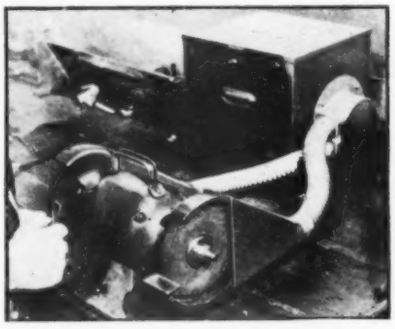


MAN COOLER—*Dc-Bothezat Ventilating Equipment Div., American Machine and Metals, Inc., East Moline, Ill.* Called the "Hy-V" air jet, this man cooler is column-mounted and adjustable to blow in any direction. Fan sizes available range from 18 to 30 in. dia., with capacities from 2,100 to 11,420 cu. ft. per min.; nozzle velocities from 2,340 to 5,780 ft. per min. Vol. 85, p. 572.

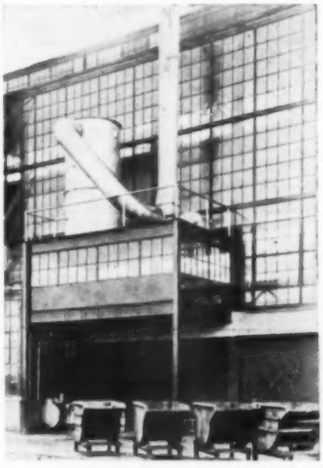
EXHAUSTER FILTER — *Hisey-Wolf Machine Co., Cincinnati, Ohio.* Four combination exhausters and filters for attachment to different sized grinders are recommended for machines with two 8-, 12-, 14-, or 24-in. wheels. Vol. 85, p. 937.



AIR COMPRESSOR — *Schramm, Inc., Westchester, Pa.* This small compressor is suitable for pressures up to 200 lb. The unit of four cylinder V-type construction does not require cooling unit or running water. Compressor is recommended for drilling, spraying, riveting, chiseling, chipping, and sand-blasting. Mechanical intake valve and long-life discharge valve are standard equipment. Vol. 85, p. 1354.

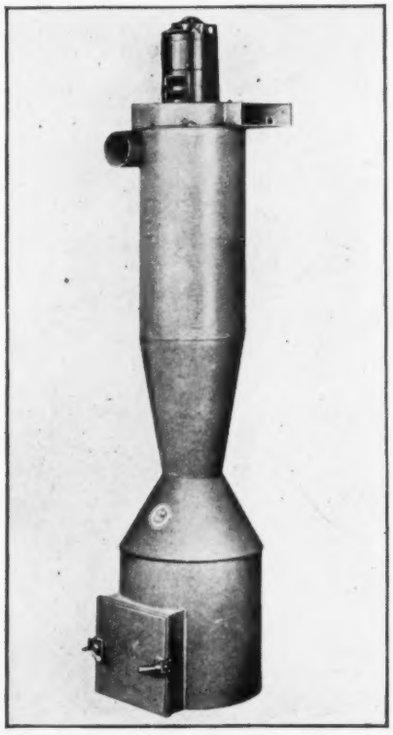


PORTABLE DUST COLLECTOR — *Aget-Detroit Mfg. Co., 952 Book Building, Detroit, Mich.* "Dustkop" Model PM100, a compact, portable dust collector, is suitable for small bench, surface and tool grinders. Air intake capacity of 260 cu. ft. per minute is developed by a 1/6 hp., 110-volt split-phase motor. Vol. 85, p. 1072.



DUST COLLECTOR — *Claude B. Schneible Co., 3951 Lawrence Ave., Chicago, Ill.* The "Multi-Wash" dust collector is suitable for all types of grinding, polishing and buffing operations, and is available in sizes to handle from 400 to 30,000 cu. ft. per min. of dirty air. Vol. 85, p. 208.

PLANT SERVICE EQUIPMENT—Drafting Supplies

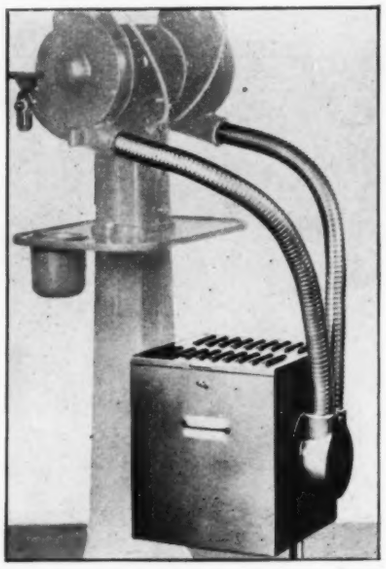


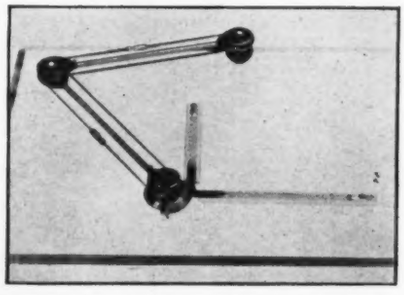
DUST SEPARATORS—*Torit Mfg. Co., 280 Walnut St., St. Paul, Minn.* Separators for collecting dust from grinding and polishing wheels are used with or without filter bag collectors. Suction is created by a ½ hp., 3,450 r.p.m. end-mounted motor. Vol. 85, p. 1170.

DUST COLLECTOR—*Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland, Ohio.* A large capacity dust collector holding 75 lb. of chips and grit, for use with rough grinders, consists of a familiar galvanized waste can, a blower, driven by a 1 hp. motor, which sucks the dust at high velocity into the can; and baffles at the bottom of the can. Fabric outlet bag collects dust that has not already been deposited on the bottom. Vol. 85, p. 1347.

CALCULATOR — *Cal-Ku-Scope, Inc., 233 Broadway, New York, N. Y.* With the aid of the "Cal-Ku-Scope" triangulation calculator many types of drafting problems involving the solution of sides and angles of triangular and quadrilateral figures are easily solved. Vol. 85, p. 92.

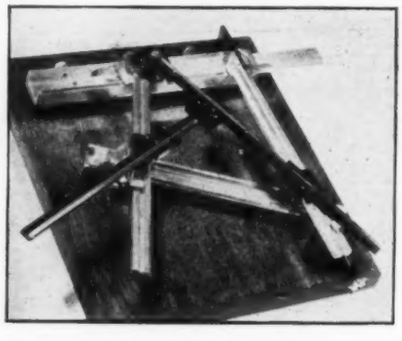
DUST COLLECTOR—*Aget Mfg. Co., 424 Book Bldg., Detroit, Mich.* Known as "Dustkop 600", and equipped with a ¼-hp., 3,450-r.p.m. motor which has a waterlift rating of approximately 3.3 in., this unit-type dust collector has a rating of 600 cu. ft. per min., and is entirely self-contained to permit rapid installation, and moving of the machine and collector as a unit. Vol. 85, p. 572.

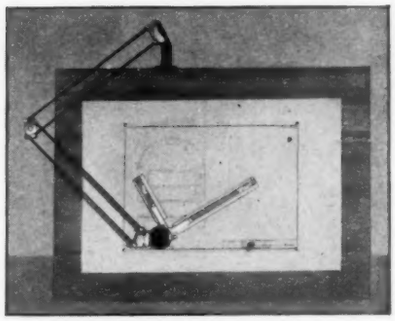




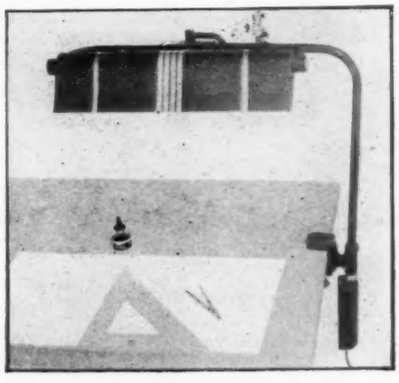
DRAFTING MACHINE — *Frederick Post Co., Hamlin & Avondale Aves., Chicago, Ill.* Equipped with "Quick Flick" control, the "True Line" drafting machine includes a protractor, vernier, T-square, scales and triangles. Vol. 85, p. 827.

DRAFTING PAPER — *Lumbric Mfg. Co., 19 Park Place, New York, N. Y.* A water-marking process has been developed that makes it possible to obtain any grade of paper used in factory, drawing room and office, with the company's own watermark incorporated into the body of paper. Not shown. Vol. 85, p. 188.

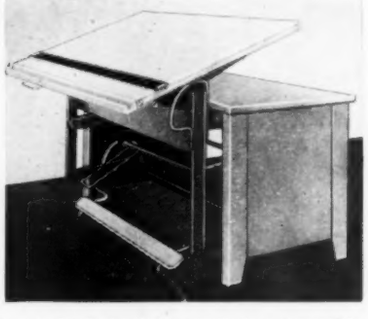




DRAFTING MACHINE—*Drafto Co., 112 Walnut St., Cochranton, Pa.* The Model No. 60 "Master-Drafto" drafting machine for drawing sheets up to 24 × 36 in. is light in weight and easy to operate. Stainless steel protractor plate is graduated to 2 deg., and can be set accurately to ½ deg. by use of a vernier. Vol. 85, p. 140.

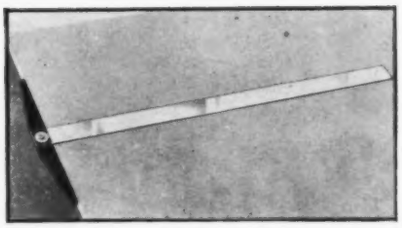


DRAFTING FIXTURE — *Frederick Post Co., P. O. Box 803, Chicago, Ill.* Light approximating the quality of northern daylight is provided by a special "artificial sky" reflector in this draftsman's fluorescent lighting fixture. Two models are available—one fastened to the drawing board by a clamp, and the other with a screw anchor attachment for permanent installation. Vol. 85, p. 138.

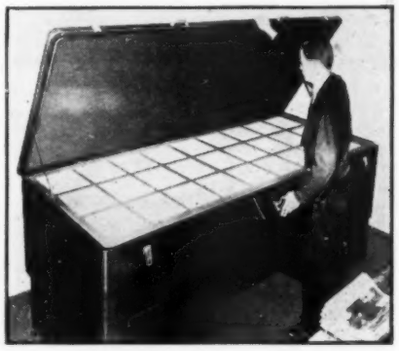


AUTO-SHIFT DRAWING TABLES—*Hamilton Mfg. Co., Two Rivers, Wis.* Drawing board, reference surface, reference drawer, tool drawer and filing space are efficiently arranged in the auto-shift drawing tables. The drawing board comes in 36 × 60 in., 36 × 72 in., and 42 × 72 in. sizes. Vol. 85, p. 1022.

CIRCLE METER—*Interstate Sales Co., 1123 Broadway, New York, N. Y.* The Wolfe circle meter has been developed for instantaneous readings in fractions of an inch of diameters and circumferences of circles with diameters up to 72 in. Not shown. Vol. 85, p. 1170.



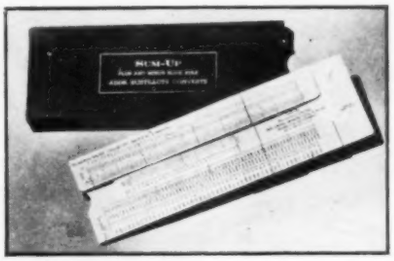
PLASTIC T-SQUARE — *Engineering Sales Co., Sheboygan, Wis.* The Escolite T-square, with head made of black laminated bakelite composition and blade of 0.09-in. thick transparent plastic, is particularly adaptable where it is desirable to view the entire drawing without moving the T-square. Vol. 85, p. 734.



PHOTOCOPYING UNIT — *Hunter Electro-Copyist, Inc., Syracuse, N. Y.* Large single drawings, 36 × 88 in., or many small drawings can be printed at once with the contact photocopying equipment. Vol. 85, p. 1176.

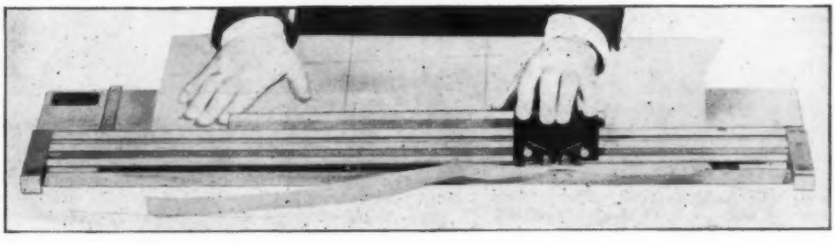
WHITEPRINTER — *Ozalid Products Div., General Aniline & Film Corp., Johnson City, N. Y.* The new Model "C" automatic Whiteprint machine, which requires only 19 sq. ft. of floor space, is synchronized to print and develop sensitized materials at speeds up to 12½ ft. per minute. Vol. 85, p. 1022.

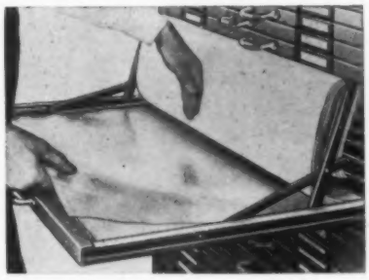
SLIDE RULE—*Sum-Up Slide Rule Co., 114 Liberty St., New York, N. Y.* An inexpensive slide rule which adds, subtracts and converts inches and millimeters saves time in making and checking calculations for drawings, layouts and patterns. Vol. 85, p. 946.



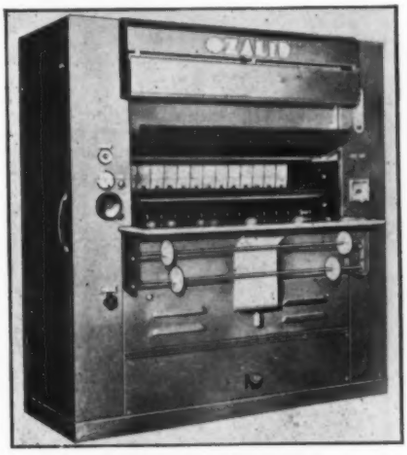
DRAFTING TABLES—*Frederick Post Co., P. O. Box 803, Chicago, Ill.* Easily adjustable "Primo Metapost" and "Metapost" drafting tables are available in eleven sizes, ranging from 31 × 42 in. to 48 × 96 in. Vol. 85, p. 38.

FILING CABINETS—*All-Steel Equip Co., Aurora, Ill.* Durable, easily operated cabinets are available in three-drawer and five-drawer units, in four sizes. Smallest cabinet holds drawings 24 × 18 in. Largest is for 48 × 36 in. blueprints. Vol. 85, p. 42.





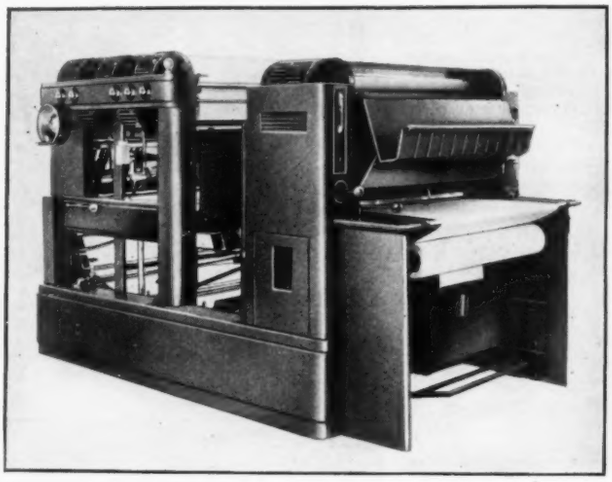
TRACING LIFTER FILE—*Hamilton Mfg. Co., Two Rivers, Wis.* The "Calumet" tracing lifter file is assembled into units which have ten 1-in. high drawers accommodating 100 tracings each. Vol. 85, p. 208.



WHITE PRINT MACHINE — *Ozalid Products Div., General Aniline & Film Corp., Johnson City, N. Y.* Finished white prints can be produced at speeds up to 20 ft. per minute with the Model B white print machine. Printer and developer are combined in one compact unit. Made in two easy steps—exposure and dry development. Vol. 85, p. 1292.

HIGH SPEED DEVELOPER—*Charles Bruning Co., Inc., 100 Reade St., New York, N. Y.* Designed for use with the Bruning Model 75 BW printer, the No. 159 Volumatic developer permits entire printing and developing operation on sensitized paper by one operator. Vol. 85, p. 1023.

TRIMMING MACHINE—*Edi Trimming Machine, 611 W. 112th St., New York, N. Y.* A device for trimming blueprints, drawings and tracing cloth, which performs cutting by razor blades held on a sliding block, is made in four sizes to cut material up to 25, 31, 43, or 55 in. Vol. 85, p. 1290.



BLUEPRINT MACHINE—*C. F. Pease Co., 2601 W. Irving Park Rd., Chicago, Ill.* The Model 22-16 blueprinting machine combines two types of blueprinting units; a Model 22 printer operating with a Model 16 washing and drying machine. Vol. 85, p. 36.

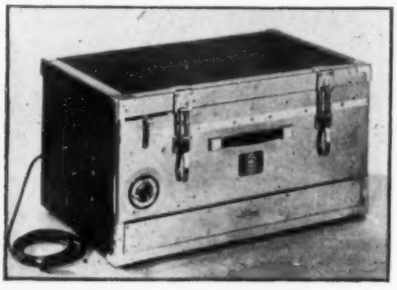
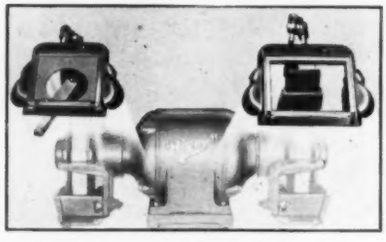
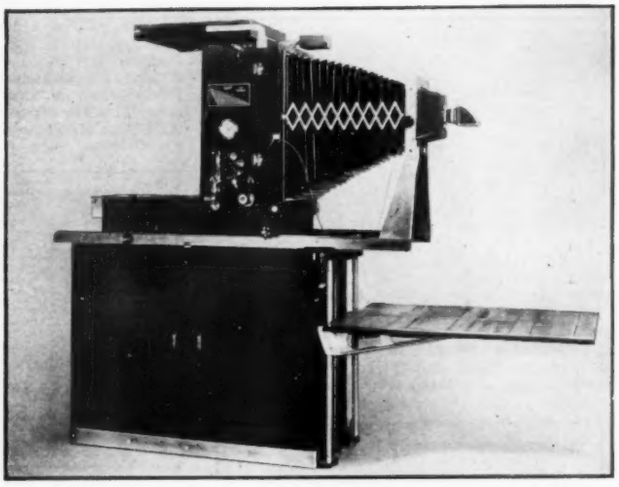


PHOTO-COPIER — *Hunter Electro-Copyist, Inc., Syracuse, N. Y.* This "Electro-Copyist" machine for multiple reproduction by photo-process incorporates additional convenience features. A flip of a switch turns on white or amber vacuum bulbs for positive or negative prints. Vol. 85, p. 142.



ILLUMINATED SHIELDS — *Hisey-Wolf Co., Cincinnati, Ohio.* Illuminated shields for grinding wheels are wired so that they automatically light when machine is started. Each guard has switch and two rough-surface bulbs. Frame is an aluminum casting. Model 3LLM has a 4½ in. magnifying lens with 10 in. focal length. It is ideal for close grinding work. Plain glass under lens prevents pitting. Model 5LL has a 9 × 7 in. clear laminated shatterproof glass. This shield is recommended for 12 in. and larger wheels, while Model 3LL, which is similar except for 5 × 7 in. glass, is recommended for 10 in. and smaller wheels. Vol. 85, p. 1350.

TRACING CLOTH—*Frederick Post Co., Box 803, Chicago, Ill.* Clear blueprints can be made from pencil tracings on Whitex, a white tracing cloth. Not shown. Vol. 85, p. 948.



PRINTING MACHINE—*Charles Bruning Co., 100 Reade St., New York, N. Y.* The Model 55 BW printing machine measures only 32 in. wide, 62 in. long, and 48 in. high. This 42-in. printer operates with either cut sheets or roll stock and prints ink tracings at 12 to 15 ft. per min. Vol. 85, p. 140.

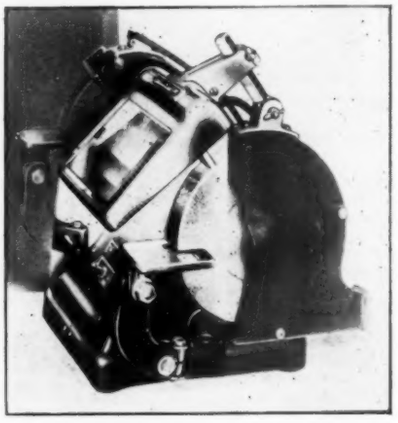
BLUE LINE PAPER—*Frederick Post Co., Box 803, Chicago, Ill.* Printing out to a cleaner, whiter background and at the same time leaving all lines in deeply colored contrast, "Postex" blue line paper is suitable for use with white print dry developer or ammonia vapor machines. Not shown. Vol. 85, p. 321.

TRANSFER FILM — *Eastman Kodak Co., Rochester, N. Y.* With the use of Matte Transfer Film, a photographic material for sensitizing metal plates for use in a templet production process, engineering drawings can be printed either by contact or by projection on photosensitive metal sheets. Processed plates bearing the photographic image are then sent directly to the templet department to be cut out and used as a pattern. Not shown. Vol. 85, p. 576.

SENSITIZED EMULSION — *Republic Engineering Products, Inc., 480 Lexington Ave., New York, N. Y.* Materials other than aluminum, such as steel plate, brass, copper, various steel alloys, as well as plywood and plastics, can now be coated with sensitized emulsion suitable for making photographic copies. Not shown. Vol. 85, p. 738.

CLEAR GLASS COATER — *John C. Dolph Co., 168 Emmett St., Newark, N. J.* Glass articles such as drop lights which are exposed to welding spatter can be protected with the No. 53 clear glass coater. It is also useful for protecting port-hole glass and similar parts during machine or ship construction. Not shown. Vol. 85, p. 325.

PHOTO-COPYING MACHINE—*Haloid Co., Rochester, N. Y.* "Rectigraph" copying unit is a complete machine which photographs, develops and fixes the print in the unit itself. Vol. 85, p. 38.



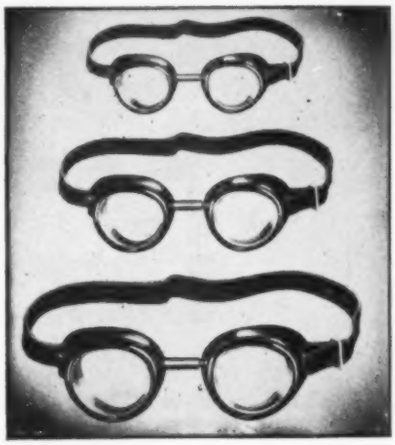
ILLUMINATED SHIELD — *Stanley Electric Tool Div., New Britain, Conn.* Suitable for use on all grinders the "Flud-Lite" eyeshield has two bayonet type light bulbs made with supported filaments to withstand vibration. It throws light directly on grinding wheel and work. Vol. 85, p. 366.

PHOTO-SENSITIZED METAL — *Republic Engineering Products, Inc., 480 Lexington Ave., New York, N. Y.* Photosensitized metal makes possible permanent, accurate drawings, either enlarged or reduced from a master negative. Use of an aluminum base eliminates distortion and permits drawings to be cut out and used as a templet. Not shown. Vol. 85, p. 142.

RIMLESS SAFETY GLASSES—*Tulca Div., Univis Lens Co., Dayton, Ohio.* Rimless type safety spectacles for use by supervisors, checkers, inspectors and maintenance men are available with or without side shields. Vol. 85, p. 1294.

FACE PROTECTORS—*Boyer-Campbell Co., 6540 Antoine St., Detroit, Mich.* Two improvements in face protection for industrial workers are a welding helmet with special features and a low-priced face shield with a plastic window. Vol. 85, p. 38.

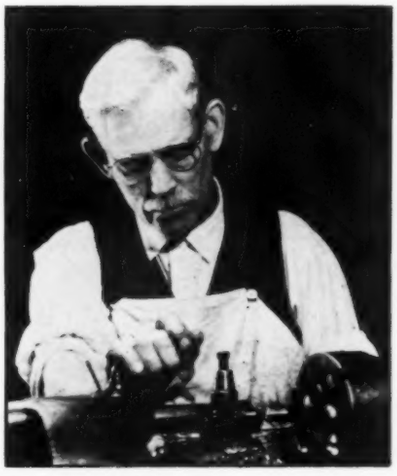
SAFETY GOGGLES—*Kimball Safety Products Co., 7314 Wade Park Ave., Cleveland, Ohio.* "FaceFitt" goggles, drop-eye shaped, light weight, ventilated top and bottom, are available in sizes 42 × 45 mm., 45 × 48 mm., and 45 × 51 mm. Vol. 85, p. 1176.



PROTECTIVE CREAM—*Mitts, 367 E. 45th St., Brooklyn, N. Y.* Irritations and infections of workmen's hands are prevented by "Mitts" protective cream. Not shown. Vol. 85, p. 369.

EYESHIELD—*Jackson Products, 6553 Woodward Ave., Detroit, Mich.* Spectacles can be worn without interference from the Type BX welding eyeshield which takes standard 2 × 4¼ in. lenses secured in the frame by an improved spring. Vol. 85, p. 140.

RESPIRATOR — *Pulmosan Safety Equipment Corp., 176 Johnson St., Brooklyn, N. Y.* The Model M-3-C respirator provides protection from fumes created by spraying of paints, enamels, lacquers and chemicals. Not shown. Vol. 85, p. 1023.

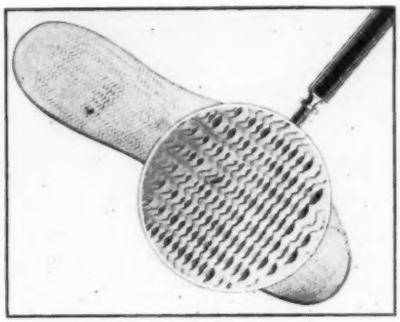


SAFETY GOGGLES—*American Optical Co., Southbridge, Mass.* For the benefit of the many industrial workers who are visually deficient and should wear safety goggles, seven different styles are available fitted with Super Armorplate lenses which can be ground to prescription. Vol. 85, p. 834.

EYE PROTECTORS—*B. F. McDonald Co., 1248 S. Hope St., Los Angeles, Calif.* "I-gards", all-plastic industrial eye protectors, are injection molded, require no grinding, are inexpensive and strong. Vol. 85, p. 1074.

SWEATBAND—*American Optical Co., Southbridge, Mass.* A lightweight absorbent sweatband of synthetic sponge rubber, 7½ in. long and exceptionally wide, keeps sweat out of eyes and off goggles. Vol. 85, p. 1076.

GOGGLE LENS—*Univis Lens Co., Dayton, Ohio.* The "Tulca" goggle lens is of dimensions equal to those of standard glass lenses but weighs only half as much and provides increased safety for all industrial uses. Not shown. Vol. 85, p. 94.



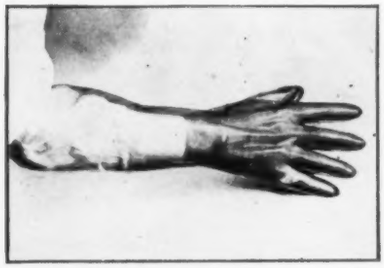
INDUSTRIAL SHOES—*Sperry Shoe Div., United States Rubber Co., Beacon Falls, Conn.* The non-slip feature of the sole makes "Top-Sider" footwear particularly advantageous for workmen in industrial jobs where there is danger of slipping on wet floors. Vol. 85, p. 892.

WORK GLOVES—*Miller Rubber Co., Akron, Ohio.* Neoprene coating gives work gloves a tough wearing surface and increases wearing life. Vol. 85, p. 38.

PLANT-SERVICE EQUIPMENT

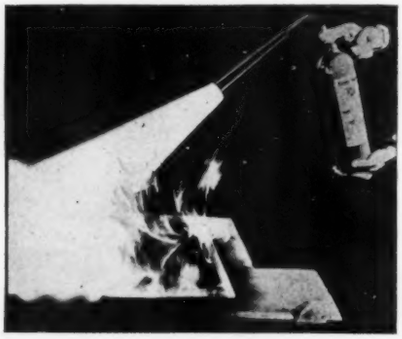
SAFETY GOGGLE—*American Optical Co., Southbridge, Mass.* The sturdy, comfortable "On-Center" safety goggle of the spectacle type has many outstanding features including the protection of "Super Armorplate" clear or "Calobar" lenses. Vol. 85, p. 513.

FILTERS—*S. G. Frantz Co., Inc.*, 161 *Grand St., New York, N. Y.* Permanent magnet Ferro Filters with capacities of 5 and 90 gallons of lubricating oil per minute have been added to the PQ series. Fine iron particles as small as 1/25,000-in. diameter can be extracted with these filters. Vol. 85, p. 946.



TRANSPARENT GLOVES—*Resistoflex Corp., Belleville, N. J.* With a high resistance to tearing and abrasion, "Resistoflex PVA" transparent gloves have been developed expressly to prevent oils and solvents from coming into contact with the skin. They are available in four sizes from 8 to 11 and in three lengths from 10½ to 18 in. Vol. 85, p. 520.

DUSTFOE RESPIRATOR — *Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa.* The Dustfoe Respirator with a single filter can be completely disassembled without tools in a few seconds. All parts are interchangeable and except for filters, which are inexpensive and can be replaced with each cleaning, can be washed and sterilized. Face piece may be shaped to fit face contours. Vol. 85, p. 1354.



EXTINGUISHER — *Walter Kidde & Co., Bloomfield, N. J.* The trigger control valve is standard equipment on the new type 4-lb. carbon dioxide extinguisher. Discharged by pulling a trigger this type control permits faster action and insures no wasting of the carbon dioxide gas. Vol. 85, p. 572.

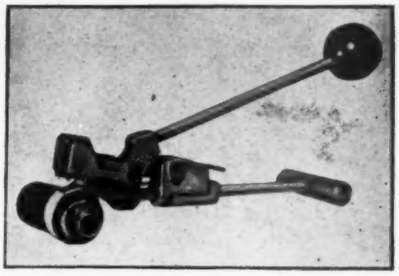
STEEL GRATING—*Wm. F. Klemp Co., 6601 S. Melvina Ave., Chicago, Ill.* Suitable for inside and outside passage ways, platforms, ramps, stair treads, and coverings for flow-ways, a welded steel grating of one piece construction, having a nonslip self-cleaning surface, is available in panels 24 in. wide and up to 35 ft. in length. Not shown. Vol. 85, p. 901.

PROTECTIVE APRON—*American Optical Co., Southbridge, Mass.* Made in two styles and eleven sizes, the Protectocoat resists oils, tar, greases, acids, chemicals, paints, varnishes, lacquers, cutting fluids, solvents, kerosene, gasoline, creosote, naphtha, caustics and alkalis. Not shown. Vol. 85, p. 786.

INDUSTRIAL TIRES—*B. F. Goodrich Co., Akron, Ohio.* Function of the new Conductor Industrial Tires, available in a range of sizes, is to prevent the accumulation of a charge of static electricity large enough to produce a spark when the vehicle touches another object. Not shown. Vol. 85, p. 684.

LEATHER GLOVES—*Industrial Gloves Co., 721 Garfield Blvd., Danville, Ill.* Made of chrome tanned, split leathers, steel stitched to prevent ripping, fingerless glove, No. 14330, protects palm of hand and between thumb and forefinger but leaves fingers free to quickly handle thin sheets and small parts. Vol. 85, p. 900.

BACKING RINGS—*Wedge Protectors, Inc., 9522 Richmond Ave., Cleveland, Ohio.* Available in two styles for electric or gas welding, quality of welds in pressure piping in all standard sizes up to 8 in. can be improved materially by the use of "Wedge" backing rings. Vol. 85, p. 322.



HOSE CLAMP—*Punch-Lok Co., 430 N. Wolcott Ave., Chicago, Ill.* Applied with a special tool weighing 2½ lb., this clamp, consisting of superimposed wraps of steel bands ⅝ in. wide, can be fitted to hose from ½ to 3 in. and is intended for high-pressure couplings subject to vibration or rough handling. Vol. 85, p. 320.

COMMUTATOR BURNISHERS—*Ohio Carbon Co., 12508 Berea Rd., Cleveland, Ohio.* Film and glaze can be removed from commutators without cutting action by the Ohio burnisher. Honing is possible to a degree not reached with the finest cutting tools. Vol. 85, p. 1017.

NEOPRENE SUIT—*Industrial Products Co., 800 W. Somerset St., Philadelphia, Pa.* The "Ipco" Neoprene suit manufactured in a two-piece style with all seams vulcanized is available in three sizes. Extreme resistance to oil, acids, alkalis and many solvents is provided by this suit. Not shown. Vol. 85, p. 323.

NEW TOOLS... NEW STEELS... NEW MEN?

NEW CUTTING OILS MAY HELP OVERCOME THESE HANDICAPS

• How can you get longer life from the tools that are available? How can you produce a fine finish on the new steels? How can you be sure of accuracy and high production with new operators? Are these some of the questions that haunt you today?

The answers may be found in the cutting oils you use. And a Standard Oil Engineer can help you find them. He understands these problems. He has been working on them with other manufacturers and with the Technical men of Standard Oil. New products have been made available where needed and new recommendations set up to meet present day production requirements.

Why *experiment* with cutting oil and coolant mixtures? Take advantage of the work that has been done for you by calling in a Standard Oil Engineer. Just write the Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois. Ask for the Engineer nearest you.

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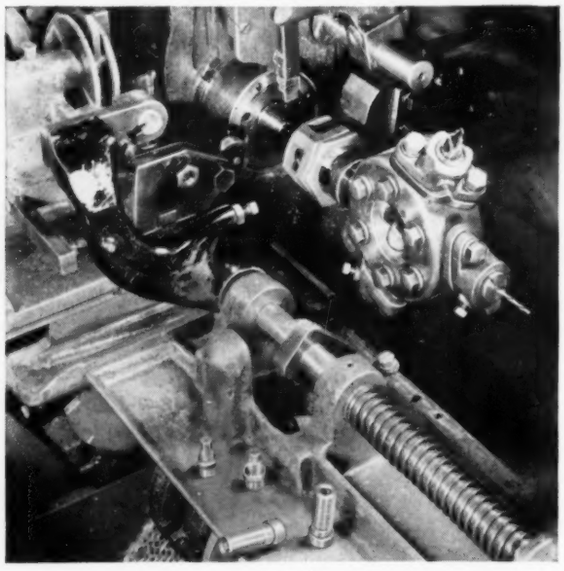
TOOLS HARD TO GET?

TRY ACME CUTTING OIL

IT DOUBLED TOOL LIFE ON THIS AUTOMATIC

Here's a suggestion which may help you save those hard-to-get tools you think are being used up too fast. Let a Standard Oil Engineer help you test Acme—a highly sulfurized, high production oil. A test, like this one conducted at a central state screw machine shop, will give you an idea of what you might gain.

Acme was tested on an automatic which was forming, threading, tapping, and cutting off 9/16 inch dia. leaded screw stock. Tools on the forming and cutting off operation had lasted 3 to 4 hours before regrinding was necessary. With Acme Cutting Oil used as recommended by



the Standard Oil Engineer, these tools lasted 6 to 7 hours. Acme not only doubled tool life, but reduced idle machine time for tool settings and cut tool room labor.

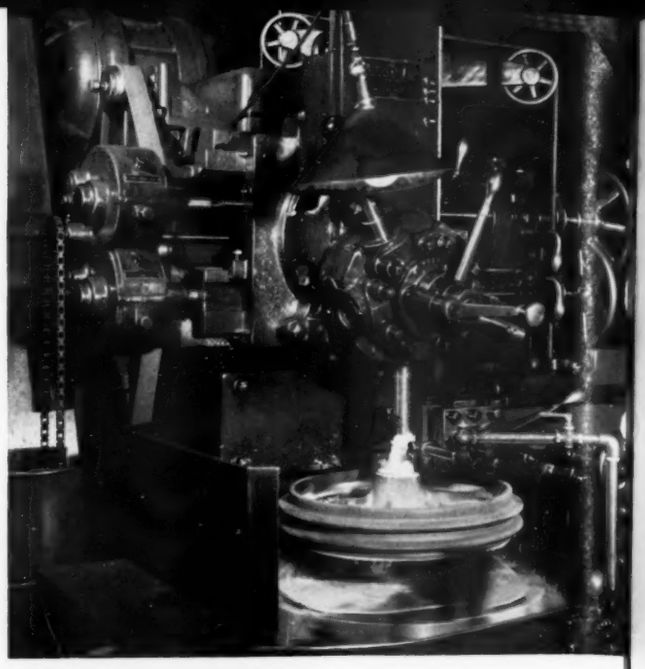
This Engineering Service will cost you nothing. You'll find an Engineer at the nearest Standard Oil office listed on this page.

SUPERLA GREASE STOPS OIL SEPARATION IN GRINDER BEARING CUPS

Are you watching the lubrication of your machine tools as closely as you are their production? Machines are operating for longer periods . . . speeds and feeds have been increased . . . bearing temperatures are bound to jump and the stage is set for trouble.

For example, ball bearings on a grinding machine were lubricated with a conventional cup grease. It wasn't designed to resist separation. When the machines were pressed to capacity, the grease failed. The oil and soap separated. Oil leaked out of the bearings and the soap caked in the grease cups. When the right grade of Superla Grease was applied, separation did not occur. It fed regularly to the bearings and kept temperatures normal.

Have a Standard Lubrication Engineer test Superla on a hot spot among your machine tool bearings.



SUPERLA SOLUBLE OIL A COOLANT THAT GIVES RUST PROTECTION

Have you hesitated to use an emulsified oil as a coolant because it might rust machines and work? Or perhaps you are using heavier oil mixtures than required just to prevent rusting? Then, try Superla Soluble Oil. Get the extra cooling quality of an emulsified oil. Use it in economical mixtures, and you'll still get rust protection.

Superla helps prevent rusting of work and machines. The oil mixes so thoroughly with the water that each piece of finished work is coated with a thin film of oil when the water from the emulsion evaporates.

Superla also emulsifies readily. It does not separate and clog machines. A Standard Oil Engineer will help you determine the mixture you need for any job.

HERE'S WHERE YOU'LL FIND STANDARD OIL ENGINEERS

A phone call or card to any of the local Standard Oil Company (Indiana) offices listed below will reach the Engineer you want. Write 910 South Michigan Avenue, Chicago, Illinois, for additional information about any of the products mentioned here. In Nebraska, write the Standard Oil Company of Nebraska at Omaha.

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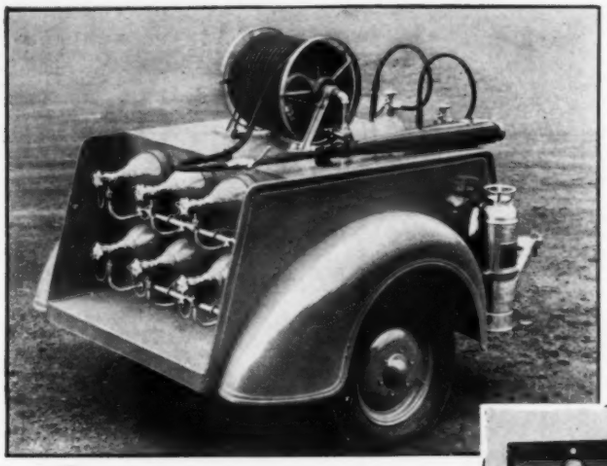
MONTANA
Billings

NORTH DAKOTA
Fargo

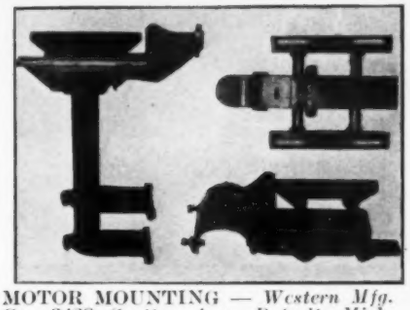
SOUTH DAKOTA
Huron

WISCONSIN
Green Bay
La Crosse
Milwaukee

WYOMING
Cheyenne



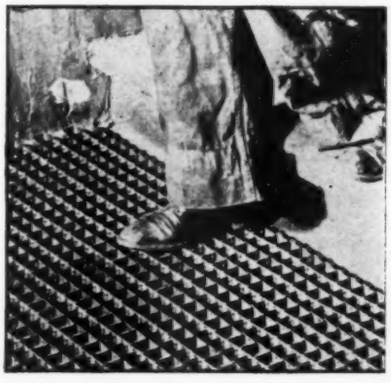
FIRE-FIGHTING TRAILER — *Walter Kidde & Co., Bloomfield, N. J.* Designed for use on large fires of inflammable liquid and electrical equipment, six carbon dioxide cylinders, two portable carbon dioxide extinguishers of 15-lb. capacity and two 2½ gal. water extinguishers are furnished on this trailer. Vol. 85, p. 36.



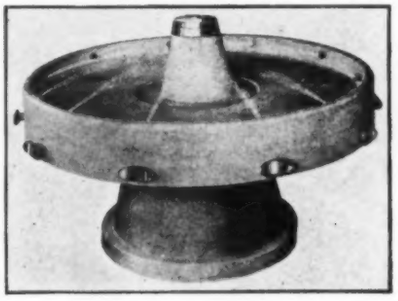
MOTOR MOUNTING — *Western Mfg. Co., 3428 Scotten Ave., Detroit, Mich.* The "Multi-Motor" mounting accommodates all N.E.M.A. frames from 204 to 326, from 1 to 15 hp. at 1,800 r.p.m. The mounting is available in three models: (1) lathe mounting bracket; (2) standard shaper bracket; (3) milling machine bracket. Vol. 85, p. 133.

CABINET—*Standard Pressed Steel Co., Box 4, Jenkintown, Philadelphia, Pa.* Cabinets to provide safe keeping for employees' tools and equipment are made with any number of drawers which measure 20 × 20 × 6 in. Vol. 85, p. 496.

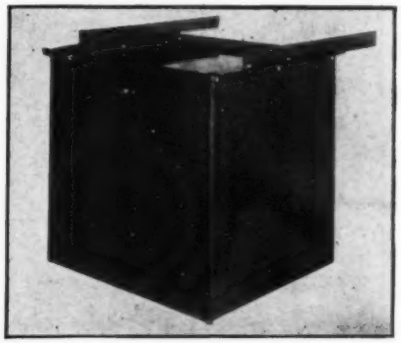
METAL LOCKER UNIT—*Penn Metal Corp. of Pennsylvania, 36 Oregon Ave., Philadelphia, Pa.* With an over-all size of 60 × 18 × 87 in., the "Pen-Kelsey" steel locker portable units have an open coat space with coat hangers permanently attached to the rod, perforated metal shoe rack at bottom, a wooden seat, and ten private, locked compartments. Vol. 85, p. 518.



SAFETY STEEL FLOOR MAT—*Wm. F. Klemp Co., 6301 S. Melvina Ave., Chicago, Ill.* An industrial steel safety mat that can be easily cleaned, has a flexible, non-skid grid and can be rolled up like a rug is made from ⅝ × 0.065 in. special analysis steel and formed into a 1¼ × 1¼ in. mesh. Vol. 85, p. 412.

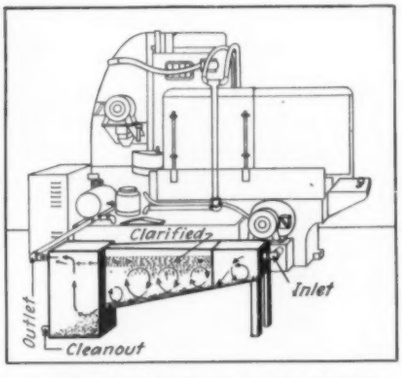


WASHFOUNTAIN SPRAYS — *Standard Washroom Equipment Co., 1000 So. Niagara St., Saginaw, Mich.* Industrial group washfountains with spray heads located on the bowl rim instead of center post to prevent splashing are available in 36 or 54 in. diameters. Vol. 85, p. 1170.



DRAWER UNITS—*Lyon Metal Products, Inc., 3011 Clark St., Aurora, Ill.* Two and three drawer units for individual storage of workers' tools, records or personal effects can be attached to work benches, tool stands, shop desks and under counters. Vol. 85, p. 1002.

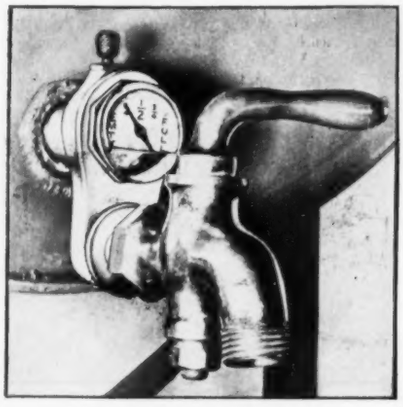
CABINET PEDESTAL FOR DRILL GRINDER—*William Sellers & Co., Inc., Philadelphia, Pa.* A suitable pedestal of the cabinet type, with a work space approximately 13 in. wide by 30 in. long on which the machine can be mounted, has been brought out for bench-type drill grinders. Vol. 85, p. 780.



INTERCEPTOR AND RECLAIMOR—*Gale Oil Separator Co., Inc., Chrysler Bldg., New York, N. Y.* Built in sizes ranging upward from 5 gal. per min., the Gale interceptor and reclaimor will reclaim cutting oils, coolants, and lubricating oils and can be used to clarify dirty oil removed from combusion engines, ice machines, electric motors, automatic tool machines, elevators and similar equipment. Vol. 85, p. 570.

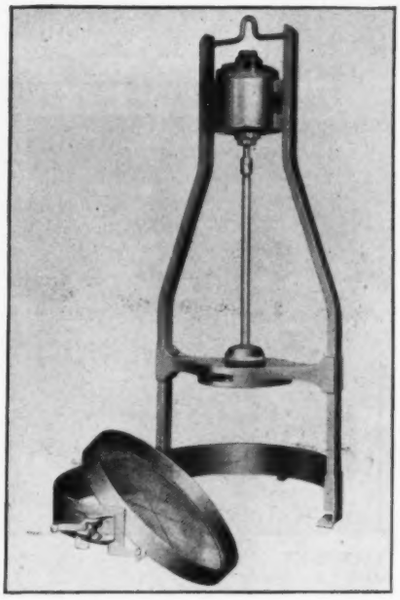
PLANT-SERVICE EQUIPMENT

TOOL CHEST—*George Scherr & Co., 128 Lafayette St., New York, N. Y.* Available in three sizes, tool chests designed to keep machinists' tools separated according to type and size, and to protect the tools from damage, have one lock for the open top and another for the drawers. Vol. 85, p. 629.

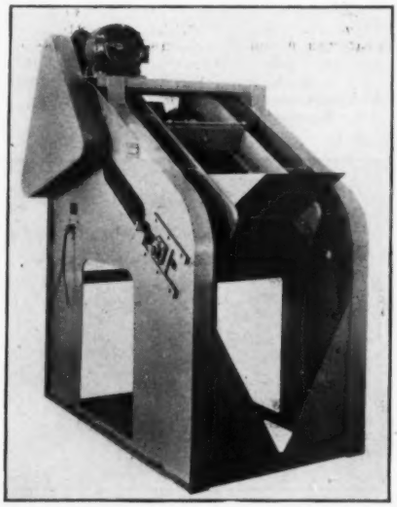


LEVEL INDICATOR—*U. C. Level Indicator, 624 East Locust St., Milwaukee, Wis.* This level indicator unit screws into faucet opening of standard 55-gal. steel drums and indicates whether drum content stands at "full," ¾, ½, ¼ or "empty." It is threaded to receive any type spigot or faucet using standard type fitting. Vol. 85, p. 676.

WATCHMAN'S CLOCK — *Morse Magneto Clock Co., 17 E. 42nd St., New York, N. Y.* Order of stations visited by the watchman, as well as hour, minute and station number is recorded on the tape clocks on which three days' records can be kept without change of paper. At the beginning and end of each tour the watchman uses an individual key with a letter which identifies his tour on the clock tape. Not shown. Vol. 85, p. 1023.



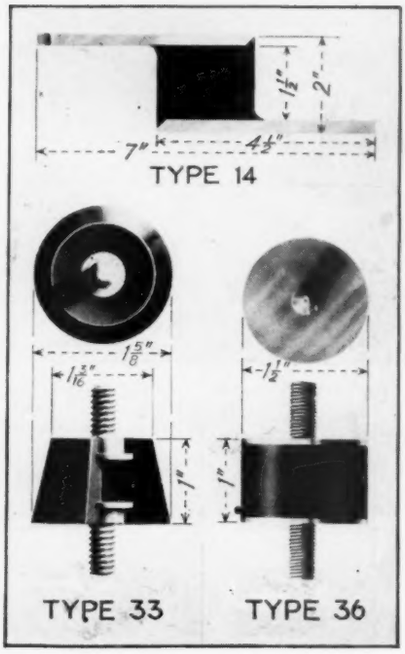
RIDDLE—*Jefferson Machine Tool Co., Fourth Cutter and Sweeney Sts., Cincinnati, Ohio.* Molding and core sands are sifted and mixed in one operation by the gyratory foundry riddle. Vol. 85, p. 1004.



MAGNETIC SEPARATOR — *Stearns Magnetic Mfg. Co., Milwaukee, Wis.* The type LD magnetic separator has been introduced for use where reclamation of mixed materials can be effected by magnetic separation methods. Vol. 85, p. 998.

←

METAL CABINETS—*Lyon Metal Products, Inc., Aurora, Ill.* Round corner construction is an outstanding feature of the "Steelart" metal cabinets which include double-door and single-door storage, wardrobe and combination cabinets, and "Desk-hi," "Counter-hi," and janitors' cabinets. Vol. 85, p. 628.



VIBRO-INSULATORS—*B. F. Goodrich Co., Akron, Ohio.* Vibro-Insulators, the devices of rubber and metal which decrease vibration and noise in machinery mounting of many types, are available in Types 14, 33 and 36. Vol. 85, p. 784.

DRUM OPENER—*Turner & Seymour Mfg. Co., Lawton Street, Torrington, Conn.* This semi-automatic drum opener which cuts a smooth edged opening in metal drums up to 35 in. in height saves opening time and eliminates injuries. Vol. 85, p. 1292.

TOOL BOX SHELF—*Challenge Machinery Co., Grand Haven, Mich.* A shelf designed for use on Challenge cast iron top benches provides a convenient place for the tool box within easy reach of the worker. Not shown. Vol. 85, p. 1117.

"TOOLS DO DOUBLE DUTY"

SUNICUT

"INCREASES TOOL LIFE 200% ... PERMITS HIGHER P-Q* "

When a change in cutting oil increases tool life as much as 200% it's news worth shouting . . . and worth hearing today!

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*Production Quota

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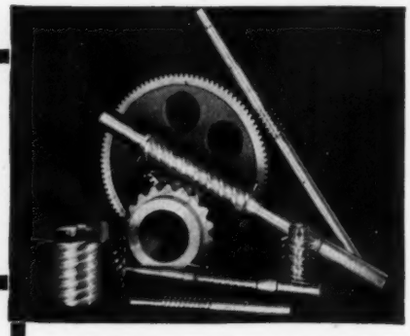
PERKINS GEARS WORMS

for *Precision* requirements



You can depend on precision work to your most exacting specifications when you make Perkins responsible for the production of your worm, helical, spiral and bevel gears.

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Spur—SPEED REDUCERS—Worm

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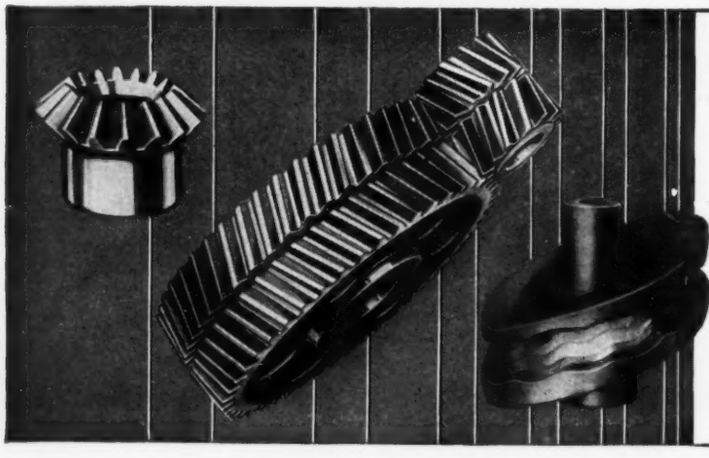

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THE JOHNSON FRICTION CLUTCH

NEW "MAXITORQ" TYPE

THE NEW "MAXITORQ" MULTI-DISC FLOATING PLATE CLUTCH*

Single

Particularly Adapted to Machine Tool Installations and for Use in All Industrial Machinery

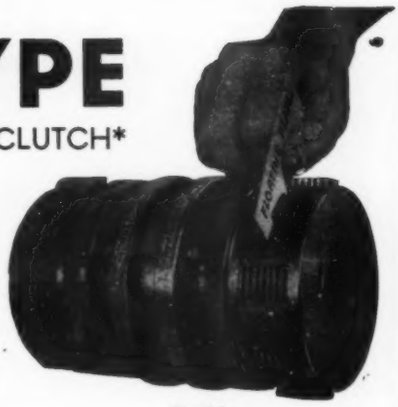
Special Characteristics

Floating Plates—Minimum of drag, abrasion or heating in neutral.

Manual Assembly—Assembled or taken apart, without use of tools.

Adjustment—Manually, by turning knurled ring clockwise after raising locking spring.

Engagement—Easily controlled with light pressure.



Double

WET or DRY PLATE:

Wet Plate—All plates of hardened steel, to be run in lubricant.

Dry Plate—Alternate plates of steel and self-lubricating bronze.

"Maxitorq" FP Multiple Disc Clutches are supplied in *single* or *double* type. The double is a compact, integral unit, and is not a combination of two single clutches. Non-metallic shoes with studs are supplied with each clutch. These, riveted into the engaging lever, prevent wear in shipper sleeve groove.

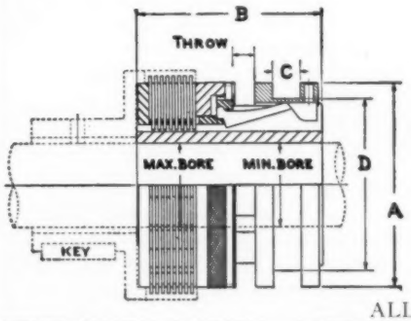
In neutral, no disc touches the ones adjacent to it (FP, Floating Plates). A separator spring* between each pair of inner discs, spreads these endways with an accordion action, so that light can be seen between all discs.

A locking plate* on the disc end of each clutch (two on double type) locks all discs against this spring tension. Counter-clockwise movement of three or four turns of knurled adjusting ring removes this spring tension, locking plate can be pressed endways slightly against the discs, when one-third of a turn of the locking plates releases it, and this plate and all discs can be removed, and the balance of the clutch taken apart.

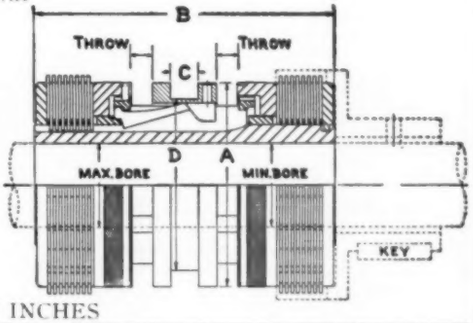
The separator springs assure quick disengaging and prevent excessive drag, abrasion or heat so common in many clutches of the multiple disc type. No oil release holes or radial oil grooves required in the plates of the FP type "Maxitorq."

These patented improvements in clutches covered by the registered trade name *"Maxitorq"* are new to multiple disc clutch construction, developed after 40 years of experience in manufacturing the well known "Johnson" Expanding Ring Friction Clutch. They are the result of years of research, breakdown tests, and actual use for several years on machine tools and other industrial machinery.

** Patented: U. S. and Foreign Countries*



Note: Cupped Hub (dotted member), should be hardened steel, with hub fitted with bronze or anti-friction bearings. Not standard equipment, but can be supplied at extra price to meet customers' requirements.



ALL DIMENSIONS NOTED ARE IN INCHES

Clutch No.	Disc. dia.	H. P. at 100 r.p.m.	Max. working torque ft. lbs.	Full active discs	Body bore Min.	Body bore Max.	Body bore Keyway	Axial pressure, lbs.	Driving lugs No.	Driving lugs Width	Throw to Engage	A Single Double	B Single	B Double	C Single Double	D Single Double
*22	2½	½	27	11	1	1⅛	1/4 x 1/8	30	3	.740	1/16	3 1/16	3 11/16	5 11/16	1/2	2 5/8
23	3½	1	53	13	1¼	1⅜	1/4 x 1/4	30	3	.990	1/16	3 1/16	4 1/16	6 1/16	5/8	3 1/8
24	3¾	1¾	92	13	1½	1⅝	3/8 x 1/4	40	3	.990	1/16	4 1/16	4 1/16	6 1/16	5/8	3 1/8
25	4½	3	158	13	1¾	1⅞	3/8 x 1/4	60	8	.740	1/16	4 1/16	4 1/16	7 1/16	3/4	4 1/8
*26	5½	5	263	16	2	2¼	1/2 x 1/4	80	12	.615	1/16	5 1/16	5	8 1/16	3/4	4 5/8

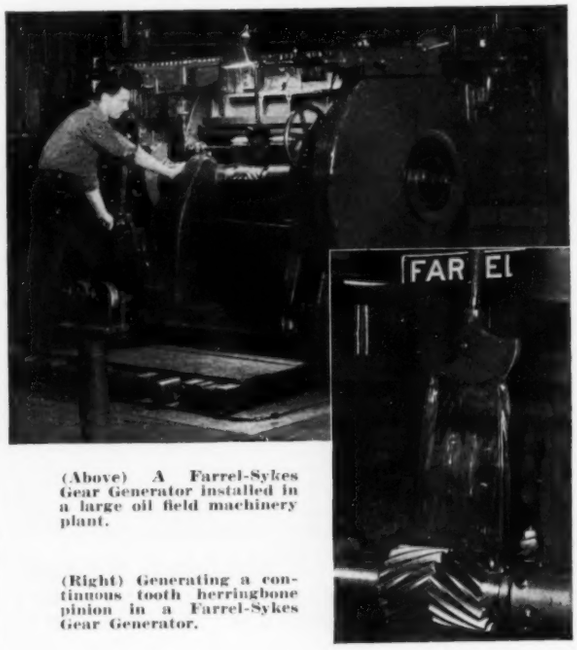
* In development stage.

Write for Multi-Disc Clutch Catalog #14.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN

FOR HIGH - SPEED, ECONOMICAL PRODUCTION OF ACCURATE GEARS

FARREL-SYKES GEAR GENERATORS



(Above) A Farrel-Sykes Gear Generator installed in a large oil field machinery plant.

(Right) Generating a continuous tooth herringbone pinion in a Farrel-Sykes Gear Generator.

Their demonstrated ability to generate precision gears economically at a speed that assures bigger output is a distinguishing feature of Farrel-Sykes Gear Generators. The earning capacity of these machines is high, their performance trouble-free and their maintenance cost low.

Farrel-Sykes Gear Generators will maintain for many thousands of hours the exceptional precision built into them initially. Hardened, ground and lapped surfaces are used wherever wear is likely to affect precision, and means of compensating for wear are provided.

With the speed, precision and economy of these machines is combined another advantage—unusual versatility. They will generate with equal facility and accuracy every type of gear used for connecting parallel axes. Their wide range of output includes not only continuous tooth herringbone gears but any known type of double helical gear, single helical and straight tooth gears with both external and internal teeth, two members of a cluster gear simultaneously, and many other toothed forms and special contours.

Farrel-Sykes Gear Generators are built in six standard sizes to generate gears from the smallest practicable minimum to 264" diameter, with face widths up to 60" and pitches from 24 DP to 0.5 DP.

For Full Information Write for Catalog No. 440

FARREL-BIRMINGHAM COMPANY, INC.
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"When your specifications call for special gears — Spur — Bevel — Mitres — Helical — Worms and Worm Gears —Reduction Units—Why not try GRANT.

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(14 to 96 D. P.)

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FlexoiD *Industrial* Couplings

A coupling by which ends of shafts are permanently bolted to flexible Thermoid Hardy type discs—requires no lubrication—no attention. Authorized dealers in principal cities carry stocks for immediate delivery.

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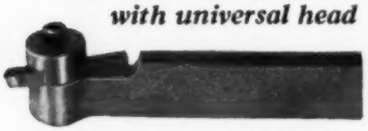
FlexoiD

FlexoiD Tool Holders *with universal head*



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FlexoiD Unit applied to Shaper

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New Features
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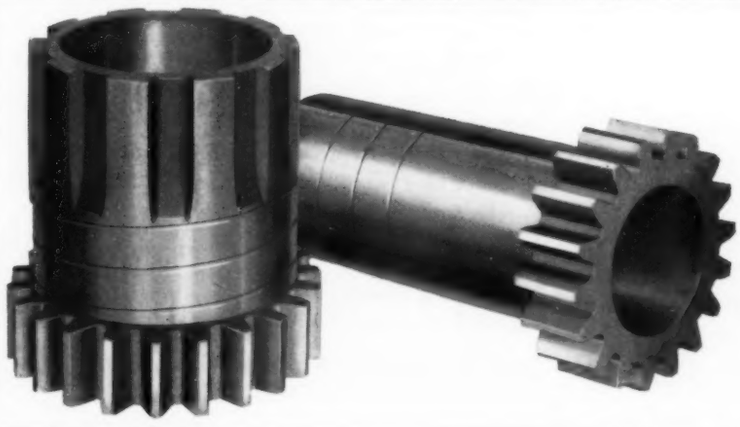

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BEVEL — MITER — RACKS

Splined Shafts A Specialty

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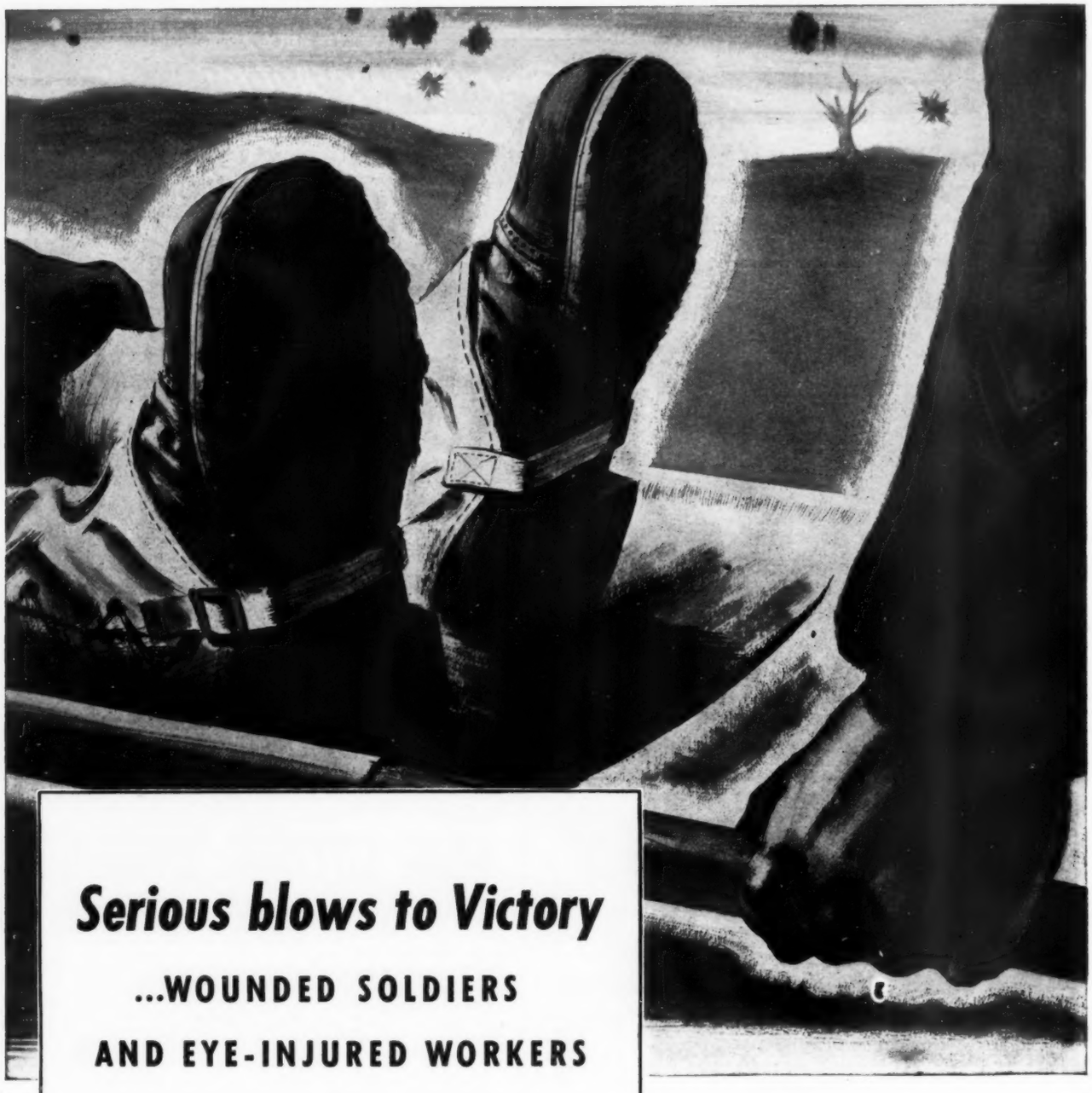

Serious blows to Victory

...WOUNDED SOLDIERS AND EYE-INJURED WORKERS

INDUSTRIAL eye-casualties that take workers—even temporarily—from the battle for the production of war materials, can hurt the cause of Victory as much—*or even more*—than the loss of a soldier or sailor. In 1940 and 1941, nearly 20,000,000 man-hours needed to turn out munitions, ships, tanks and planes were lost by *industrial eye accidents* alone.

Those lost man-hours were lost *forever.* A most terrible tragedy and waste. But the point right now is this: *eye accidents must not happen from now on.* GOGGLES MUST BE WORN. American Optical Company is working day and night to make available to plants throughout the country its line of light, comfortable, safe goggles . . . goggles equipped with Deep-Curved Super Armorplate Lenses for greater resistance to impact.

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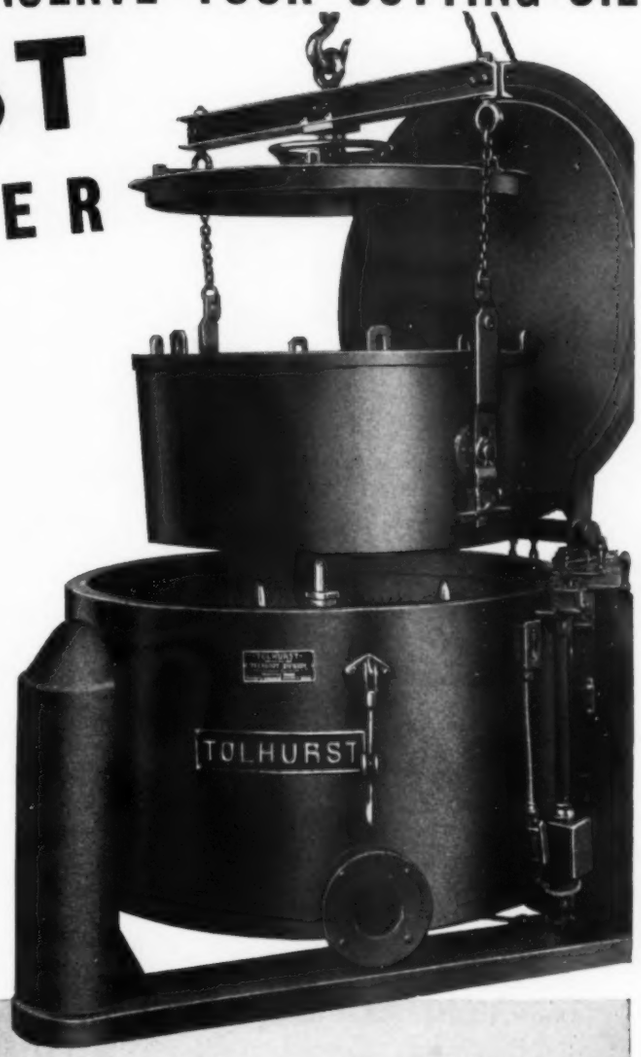
CHIP WRINGER



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Tolhurst Chip Wringers will reclaim up to 99% of oil on your metal chips. These record-breaking oil recoveries are accomplished by utilizing centrifugal force. No steam is used, thereby eliminating any loss of oil through emulsification. Operation is simple and ***safe*** — unskilled operators can run them efficiently. Tool room records of Tolhurst users show that tool wear is reduced as much as 50%. Tolhurst Chip Wringers are available in 20", 26", 40" and 48" baskets. Satisfied Tolhurst users include Allis-Chalmers, Chrysler Corporation, Ford Motor Company, Frigidaire and scores of others. Decide ***now*** to investigate Tolhurst Chip Wringers for saving money in your plant. Use the handy coupon below to get details and latest prices!

TOLHURST GALVANIZERS

Equally effective for tinning or galvanizing parts. "Spin off" excess spelter from batches of small parts in as little as two seconds time! Coating thickness regulated by accelerating rate. Imparts smoother, evener finish. Write for complete information. Use the coupon below!

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For small metal parts. Parts to be dried are placed in a ***removable*** perforated basket in the dryer. Centrifugal force and hot air completely dry the load in two to three minutes. Eliminates use of sawdust. Imparts beautiful, uniform finish. To get details, use the coupon below!

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EAST MOLINE, ILL.

TOLHURST CENTRIFUGAL DIVISION
East Moline, Illinois

YES Send details on ☐ Chip Wringers; ☐ Metal Dryers; ☐ Galvanizers; ☐ Detergent Washers. I understand that there is no obligation. Am. Mach. 1-22-42

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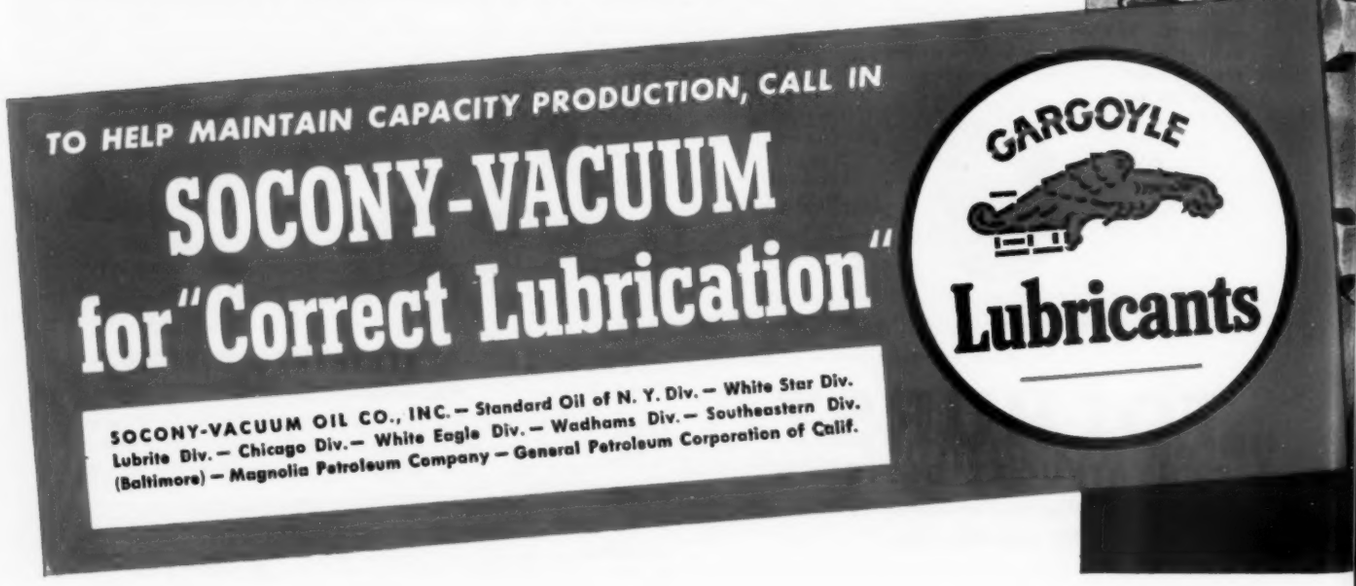
Painting a "Cushion" on Open Gears

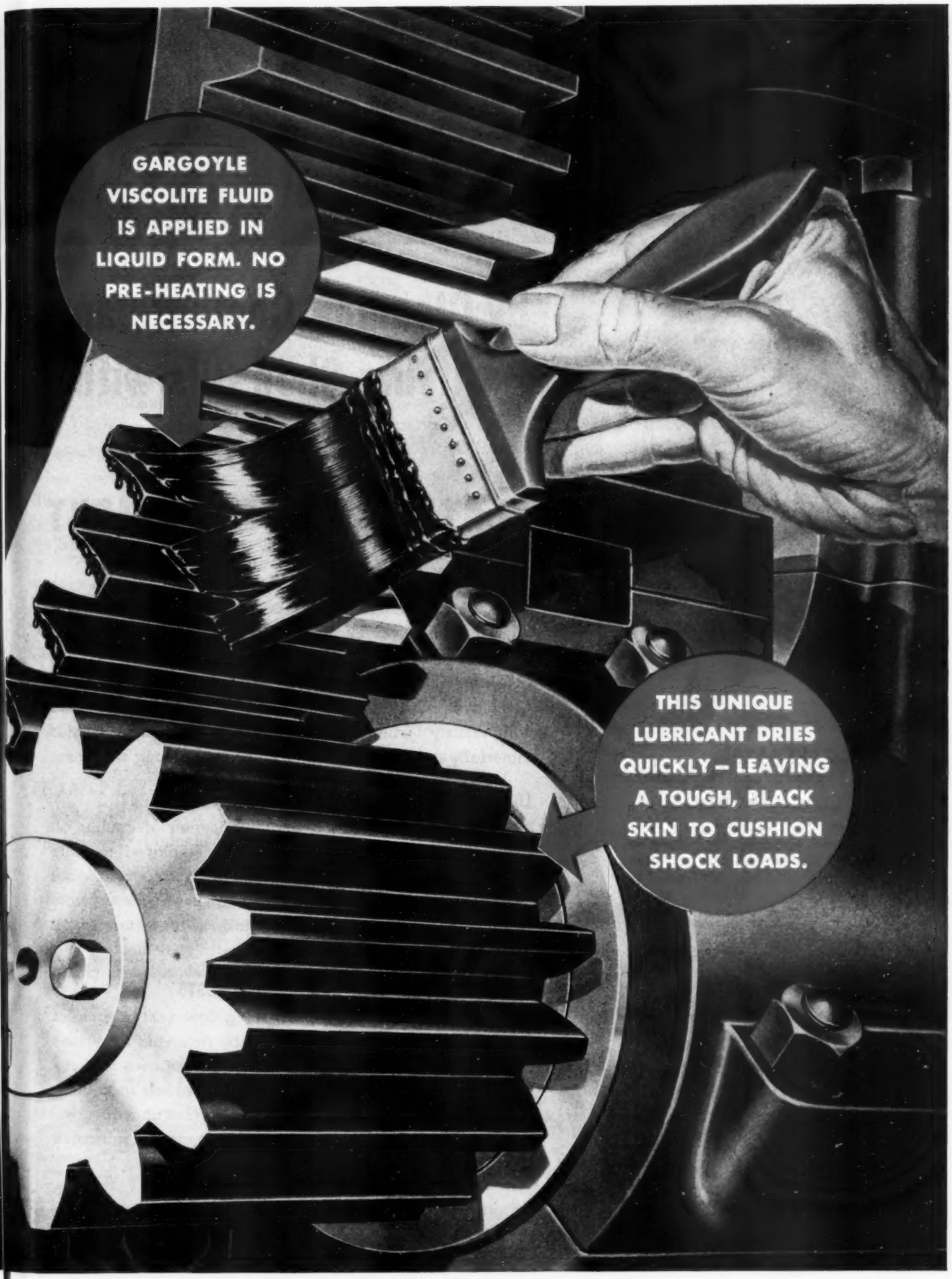
THE "CORRECT" ANSWER TO AN IMPORTANT PROBLEM IN VITAL DEFENSE PRODUCTION

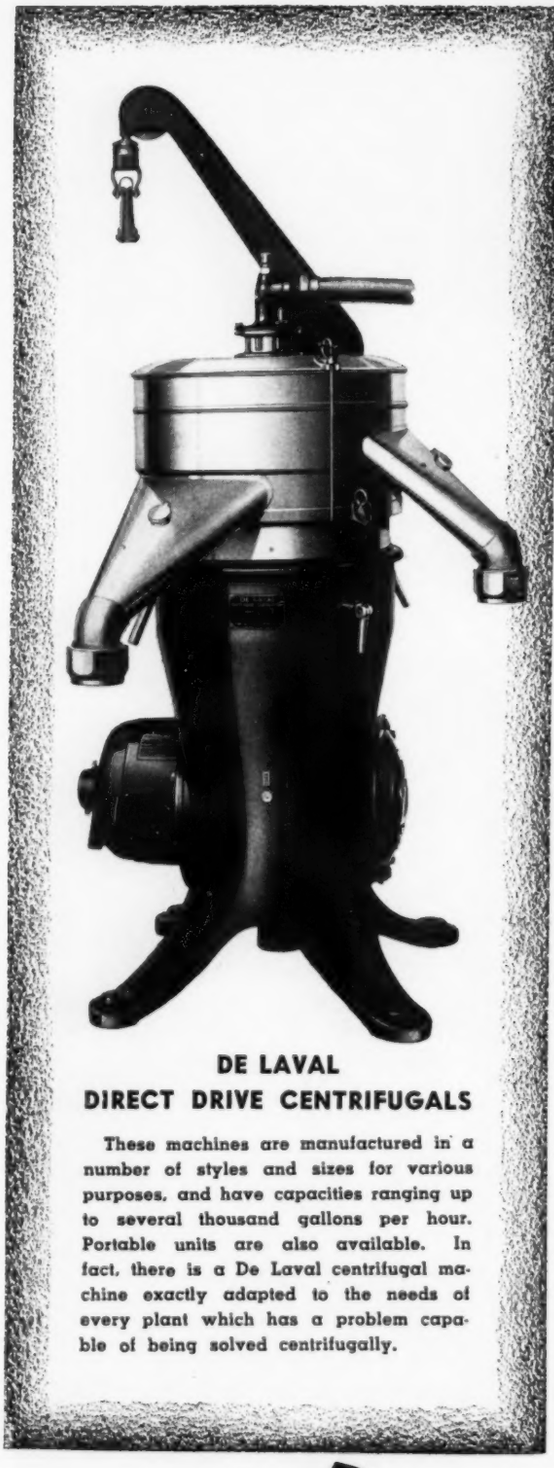
Problem: The open gears at the right must be protected by a lubricant against wear due to: (1) Heavy or shock loads, (2) Dust and dirt in the air, (3) Presence of water.

The *correct* lubricant for this job must provide: (1) A tough film to prevent metal-to-metal contact, (2) A thin film to prevent accumulation of abrasives and packing of clearances, (3) A tough "waterproof" coating.

Answer: We have created a unique lubricant for this job — *Gargoyle Viscolite Fluid.* It can be applied by hand without heating, or be fed by mechanical devices. It is made with a quick-drying, non-inflammable diluent. As the diluent evaporates, a tough, black, thin skin is formed. *This film won't squeeze out or throw off!* As the film is thin, there is no opportunity to hold or pack dirt and dust. The tough coating sheds water like a duck. In many cases, Gargoyle Viscolite Fluid has helped reduce consumption more than 50%. This lubricant is available in four viscosities to fit every set of operating conditions.


TO HELP MAINTAIN CAPACITY PRODUCTION, CALL IN
SOCONY-VACUUM
for "Correct Lubrication"
SOCONY-VACUUM OIL CO., INC. — Standard Oil of N. Y. Div. — White Star Div. Lubrite Div. — Chicago Div. — White Eagle Div. — Wadhams Div. — Southeastern Div. (Baltimore) — Magnolia Petroleum Company — General Petroleum Corporation of Calif.
GARGOYLE
Lubricants


GARGOYLE VISCOLITE FLUID IS APPLIED IN LIQUID FORM. NO PRE-HEATING IS NECESSARY.
THIS UNIQUE LUBRICANT DRIES QUICKLY – LEAVING A TOUGH, BLACK SKIN TO CUSHION SHOCK LOADS.



DE LAVAL
DIRECT DRIVE CENTRIFUGALS

These machines are manufactured in a number of styles and sizes for various purposes, and have capacities ranging up to several thousand gallons per hour. Portable units are also available. In fact, there is a De Laval centrifugal machine exactly adapted to the needs of every plant which has a problem capable of being solved centrifugally.

SPEED PRODUCTION SAVE MACHINES

by Cleaning Coolants and Purifying Shop Oils with—

DE LAVAL
CENTRIFUGAL EQUIPMENT

BETTER FINISH AND INCREASED PRODUCTION

Removing metallic and abrasive particles from coolants with the De Laval Coolant Clarifier enables grinding to closer limits, results in finer finish, makes possible the use of softer wheels and prolongs wheel life. The De Laval System enables either aqueous or oil coolant to be used continuously with its efficiency unimpaired. It also materially reduces the hazard of infection among workmen.

LONGER TOOL LIFE AND HIGHER CUTTING SPEEDS

More efficient extraction and purification of cutting oil result when the De Laval Extractor is employed to more completely extract the oil from chips and turnings. Longer tool life and higher permissible cutting speeds are possible by purifying with De Laval Oil Purifiers the extracted oil and the oil in machine sumps on central systems.

SAFEGUARD PRODUCTS AND REDUCE COSTS

The De Laval System provides a low cost means of purifying washing and slushing oils by removing impurities picked up during the processes. Oil in continuous systems is used indefinitely at full efficiency. Oil used in coating of parts before packing is rendered moisture and dirt free, insuring protection against rust and dangerous abrasive particles.

DE LAVAL

COOLANT CLARIFIERS

IMPROVE FINISH CUT COSTS

SAVE MACHINES

The De Laval Oil Purifier provides an efficient means of continually removing metallic particles, grit and water from oils in circulating lubrication systems and hydraulic systems. Purification of oil insures more continuous operation and longer machine life—a vitally important advantage now when many machines are operating 24 hours a day, when no chances can be taken with shut downs and when difficulties involved in obtaining new machines make it imperative that existing machines be carefully protected.

Another important use for De Laval centrifugal oil purifiers is found in the purification of oil during block tests. Experience in the automotive industry, for example, has shown that the De Laval System eliminates scratches and rejects and makes it safe to assemble motors into cars and trucks without removing pans after testing. Both production time aid oil savings result. There are numerous other similar applications throughout industry.

DE LAVAL EXPERIENCE IS AT YOUR SERVICE

You are invited to submit your problems to De Laval engineers and benefit by their experience.

De Laval equipment is available for removing impurities from honing oils, hydraulic press oil, vacuum pump oil, quenching and tempering oils as well as liquid coolants and lubricants involved in rolling, drawing, cooling, compressing and exhausting.

• • •

THE DE LAVAL SEPARATOR COMPANY

165 Broadway, New York — 427 Randolph St., Chicago

DE LAVAL PACIFIC COMPANY, 61 Beale St., San Francisco

THE DE LAVAL COMPANY, Limited

Montreal — Peterborough — Winnipeg — Vancouver

"HERMETIC" COOLANT CLARIFIERS

"Hermetic" Coolant Clarifiers are improving grinding operations and speeding production in many industries by removing from coolant even the tiniest particles of metal and abrasive. The coolant is discharged under pressure and foaming is eliminated. Both aqueous and oil coolants are clarified at constant efficiency.

DE LAVAL "UNI-MATIC" OIL PURIFIER

The "Uni-Matic" Oil Purifier contains all equipment necessary to purify oil, such as built-in pumps, heaters, gauges, thermometer, sight glasses, and is completely piped and ready to use. It is manufactured in capacities up to 300 g.p.h. or more depending upon the product being handled.

OIL PURIFIERS

ALL WRIGHT for every job—

large or small —special or routine

Regardless of whether your work demands special application or routine handling—whether it be 500 pounds or 40 tons—whether an electric hoist, a hand-operated high-speed hoist, traveling crane, or monorail trolley—Wright engineers know how to solve your problem *economically*.

Here are three things you get in every **WRIGHT HOIST:**

1. **SAFETY.** The load chain has a safety factor of 7 to 1. The bottom hook which is drop forged from special steel, acts as a safety governor, in that it gives warning of overload by slowly opening. These hooks possessing an unusual degree of ductility will straighten out before any part of the hoist is damaged, plus acting as a warning to the operator.

2. **EFFICIENCY.** **WRIGHT HOISTS** are fast, smooth and positive in action because of scientifically engineered design.

3. **DEPENDABILITY.** **WRIGHT HOISTS'** rugged and precision design assures year-in and year-out durability and the very minimum of maintenance cost.

SAFETY · MAINTENANCE · EFFICIENCY · WRIGHT HOISTS

Let Wright engineer your hoisting and crane problems. Work through the Wright distributor in your city. You'll find him listed in the classified telephone book.

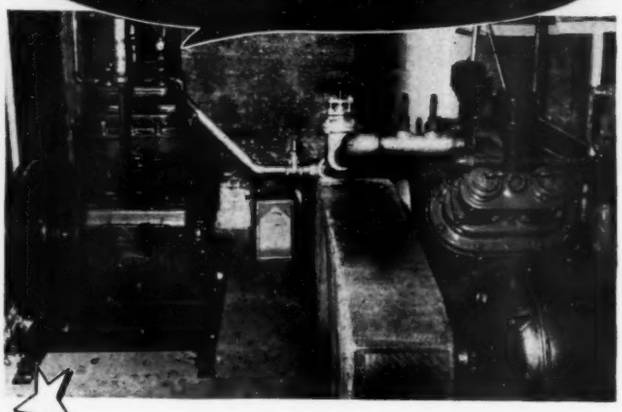
¼ to 50 tons

WRIGHT MANUFACTURING DIVISION
YORK • PENNSYLVANIA

In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, INC.
BRIDGEPORT, CONNECTICUT

Manufacturer Buys 4th CURTIS AIR COMPRESSOR



Because of Record of Efficiency and Low Maintenance Costs

The Dowst Manufacturing Company, Chicago, bought its first Curtis Air Compressor in 1921. This original machine operated constantly, 24 hours a day, six days a week, for *fifteen years, with only one minor repair being required.* And this repair was admittedly due to neglect.

As a result, this company has since purchased three additional Curtis compressors—the selection being based upon the unusually efficient performance record of previous Curtis equipment.

This is another example of the dependable, trouble-free performance of Curtis Air Compressors, proven by the operating records of thousands of installations throughout the country.

With Curtis Compressors you can benefit in two ways—by replacing your present overloaded, outworn equipment and by extending the use of air power in your plant. Curtis Compressors are available in capacities up to 360 cfm.

Curtis efficiency and record of minimum maintenance expense is the result of such design features as Timken Roller Bearings, Carbon-free Disc Valves, Centro-Ring Oiling, Automatic Pressure Unloader, and precision workmanship throughout.

● *Write for free 28-page booklet, "How Air Is Being Used in Your Industry," and complete information on Curtis air operated equipment.*

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CURTIS PNEUMATIC MACHINERY DIVISION
OF CURTIS MANUFACTURING COMPANY
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Please send me booklet, "How Air Is Being Used in Your Industry."

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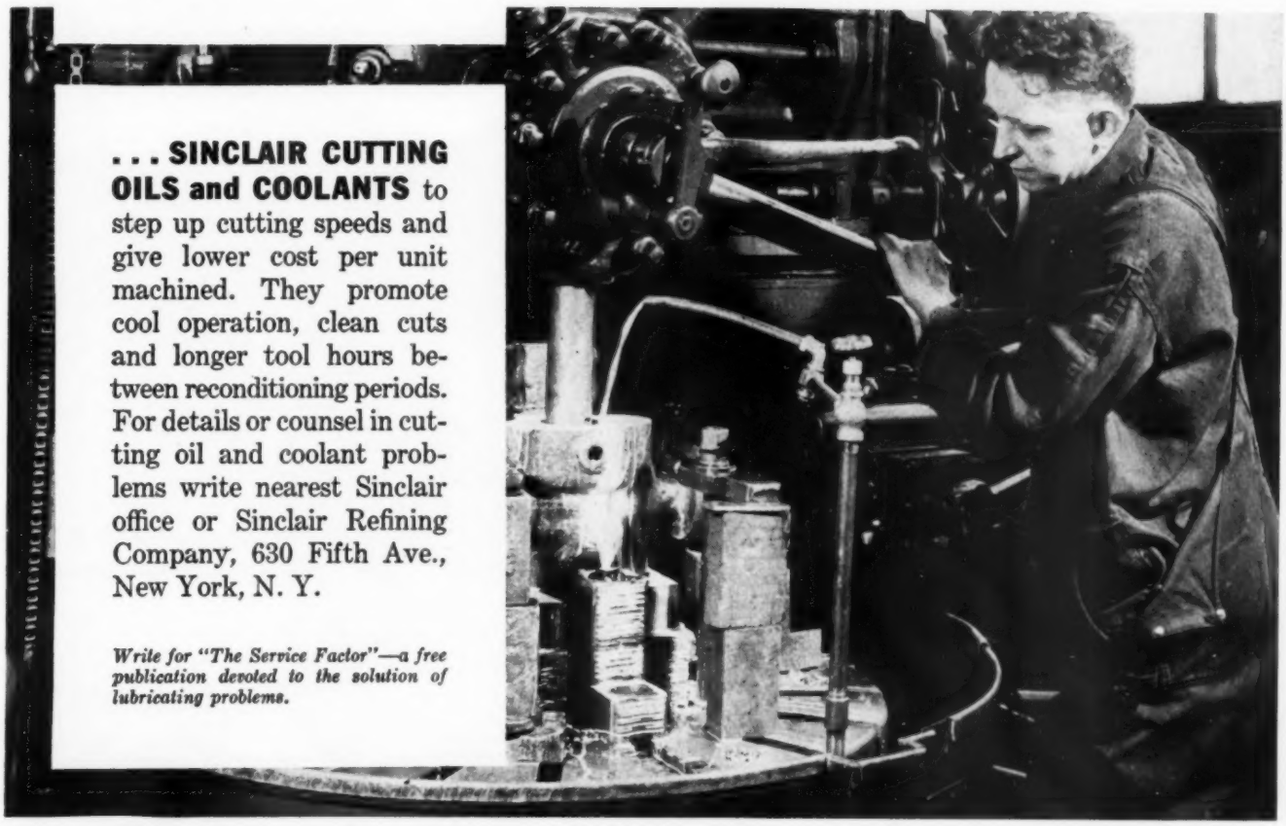
DEFENSE DRIVE bans unnecessary shut-downs. Correct cutting oils reduce time out for regrinds. For *MACHINE TOOLED* plants there are . . .



. . . SINCLAIR CUTTING OILS and COOLANTS to step up cutting speeds and give lower cost per unit machined. They promote cool operation, clean cuts and longer tool hours between reconditioning periods. For details or counsel in cutting oil and coolant problems write nearest Sinclair office or Sinclair Refining Company, 630 Fifth Ave., New York, N. Y.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.

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Birthplace of Battleships Guns and Tanks

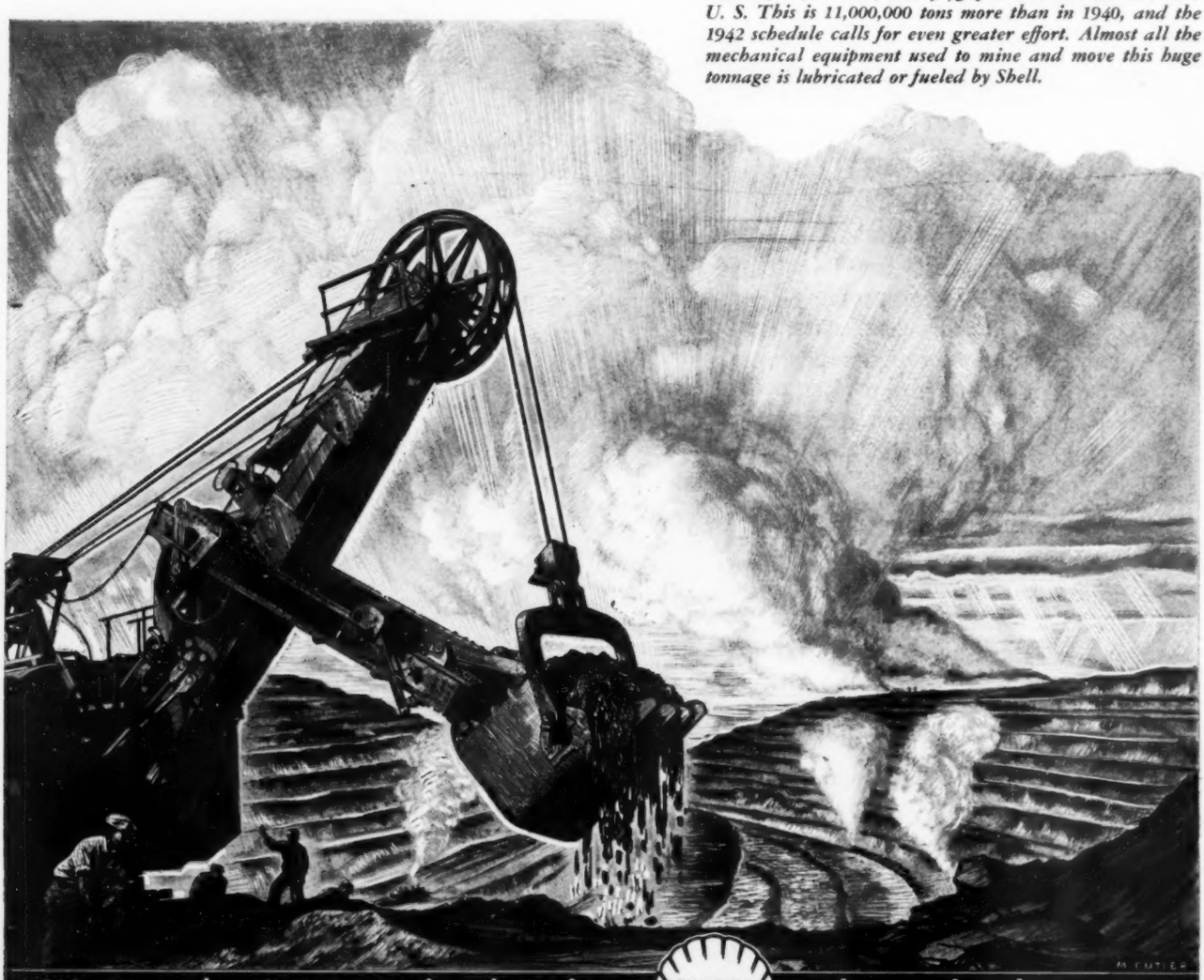
World's largest iron mine operated by Shell-Lubricated equipment

GREATEST SINGLE SOURCE of raw material for war production is the huge deposit of iron ore at Minnesota's Mesabi Range. More than 60,000,000 tons of ore were taken from this mammoth range in 1941, and this year's production will be even larger.

The fact that almost every shovel, tractor, truck and train on the Mesabi Range is lubricated or fueled by Shell offers unusual proof of Shell's ability to handle the toughest lubrication problems. Nevertheless, Shell oils and greases are constantly being improved to meet the ever more exacting demands of full-time production schedules. The Shell lubricants in use today are the result of constantly advancing technical research and development . . . are giving dependable service under conditions only a year ago considered impossible to solve.

Is your equipment getting this kind of up-to-the-minute lubrication? Call Shell and be sure. No matter what your lubrication problems may be, you will find Shell can be very definitely helpful in increasing the speed and quality of your production.

1941 output of iron ore at Mesabi Range *totalled more than 60,000,000 tons, nearly 2/3 of all iron ore mined in the U. S. This is 11,000,000 tons more than in 1940, and the 1942 schedule calls for even greater effort. Almost all the mechanical equipment used to mine and move this huge tonnage is lubricated or fueled by Shell.*



War production speeds ahead on SHELL Industrial Lubricants

Parts and Materials

Electric Motors · Other Electrical Equipment · Machine Parts · Bearings · Valves and Fittings · Materials · Processes

● AMERICAN MACHINIST'S 29TH ANNUAL BUYERS REFERENCE NUMBER

Let a Meehanite Foundry Solve Your Casting Problems

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Cincinnati, Ohio
The Cincinnati Milling Machine Co.

Cleveland, Ohio
Fulton Foundry & Machine Co.

Denver, Colo.
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Detroit, Mich.
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General Foundry & Mfg. Company

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Irvington, N. J.
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Los Angeles, Calif.
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American Laundry Machinery Co.

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St. Paul, Minn.
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Here's a book that every engineer, designer, machinery manufacturer or casting user should have! Presenting a wealth of material on the Engineering Properties, Metallurgy, Heat-Treatment, and Manufacture of Meehanite Metal, this factual Handbook tells what Meehanite castings are, and how and where they are used. Thousands of laboratory tests have been conducted to determine physical and engineering properties, under various conditions encountered in service. Accurate information is given on brittleness, tenacity, fatigue, vibration damping, wear-resistance, machinability, as well as the various strengths, elastic limit, modulus, and other design characteristics. Suggestions are included for heat-treatment, flame-hardening, and welding. It contains just the kind of information that engineering and manufacturing executives need.

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Although a nominal price of $1.00 has been established for the Meehanite Handbook, copies will be sent free to men of industry who can use the data it contains. In requesting a copy, please give your title and write on your business letterhead.

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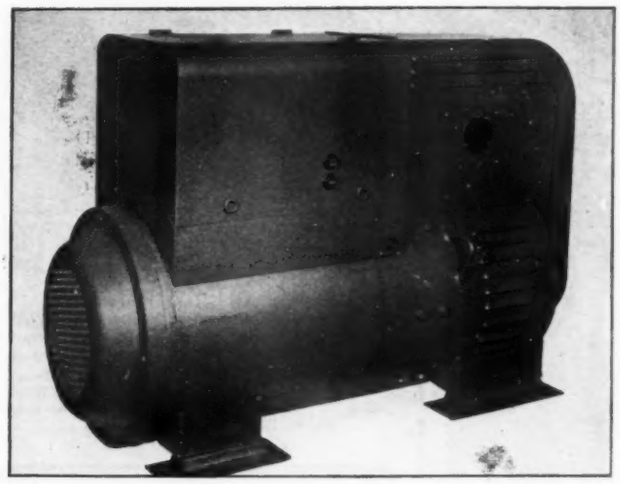
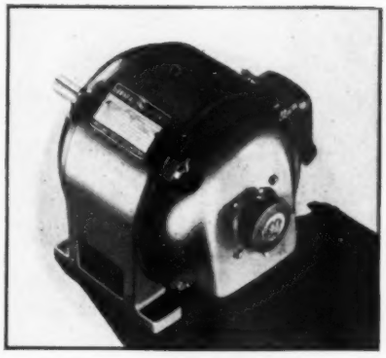
PARTS and MATERIALS

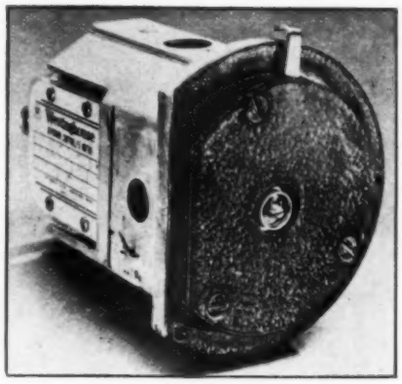


VARIABLE-SPEED A.C. DRIVE—*Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland, Ohio.* "V-S" units of 20, 25 and 30 hp., mounted horizontally, meet the demand for all-electric, a.c. adjustable-speed drive in sizes which extend this method of control to larger applications. Vol. 85, p. 33.

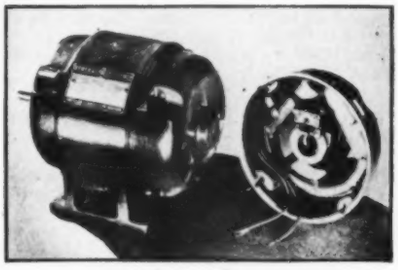
REVERSING MOTOR — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Available in ratings of from 1/6 to ¾ hp., single-phase, 60 cycle, the capacitor-start reversing motor, for use on lathes, cranes, hoists, and other industrial applications where instant reversing is necessary, operates at 1,725 r.p.m. Vol. 85, p. 998.



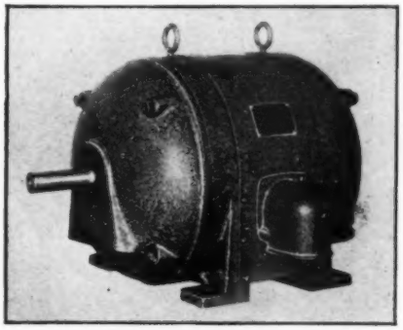
INDUCTION MOTORS—*General Electric Co., Schenectady, N. Y.* A line of "Tri-Clad" splashproof, ball bearing, polyphase induction motors in sizes from 1 to 15 hp. has been announced to supplement "Tri-Clad" polyphase and single-phase open general-purpose lines. Outstanding features include sturdy cast-iron stator frame and end shields that resist rust and corrosion, "Formex" wire windings highly resistant to moisture, and thoroughly protected ball bearings. Vol. 85, p. 520.



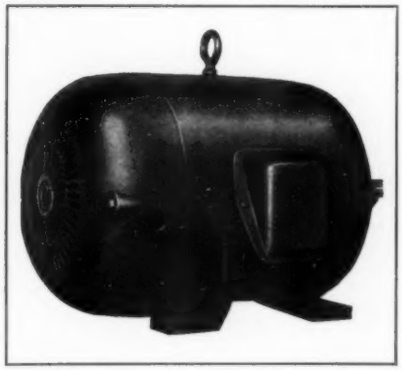
GOVERNOR-CONTROLLED MOTORS —*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Universal governor-controlled motors, are available in sizes from 1/50 to 1/20 hp., meet the need for a wide range of applications for quiet, constant speed, light-weight motor drives, in adding machines, calculating machines, check endorsers, typewriters, and other similar applications. Vol. 85, p. 515.



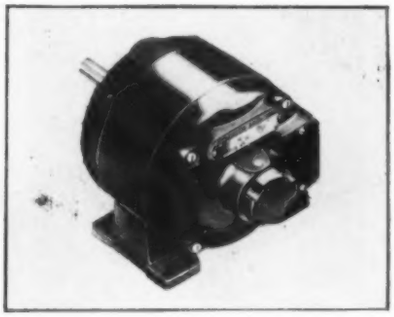
CAPACITOR MOTOR — *General Electric Co., Schenectady, N. Y.* The "Tri-Clad" capacitor motor may be obtained with either ball-bearing or sleeve-bearing construction, and is available in Type KC, for moderate starting torques, and Type KCJ, for high starting torques. Vol. 85, p. 320.



SPATTER-PROOF MOTORS — *Lima Electric Motor Co., Div. of Lima Armature Works, Inc., 438 N. Main St., Lima, Ohio.* Increased protection against such hazards as water, abrasive dust and dirt is provided in the RS semi-inclosed spatter-proof electric motor built in a large range of sizes for general and special applications. Vol. 85, p. 514.

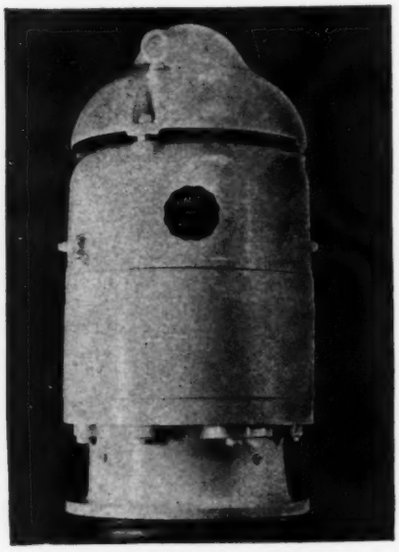


INCLOSED MOTORS—*Century Electric Co., 1806 Pine St., St. Louis, Mo.* This company has redesigned its line of totally inclosed fan cooled motors to provide improved appearance and greater protection. Vol. 85, p. 192.



FRACTIONAL - HORSEPOWER MOTOR—*General Electric Co., Schenectady, N. Y.* Cast-iron base, closely machined rabbets, "Formex" insulation, ball bearings, one-piece cast-aluminum rotor, and firmly anchored windings are features of a fractional-horsepower motor built to meet machine tool requirements. Vol. 85, p. 510.

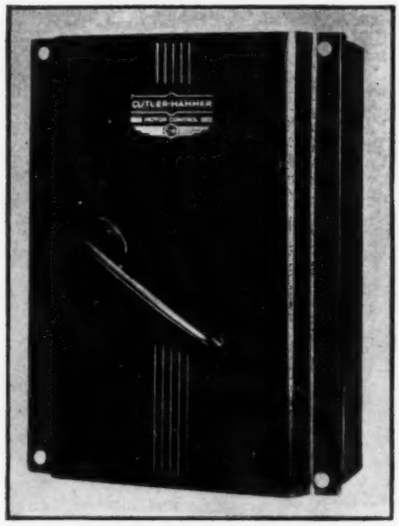
PARTS and MATERIALS—Electric Controls



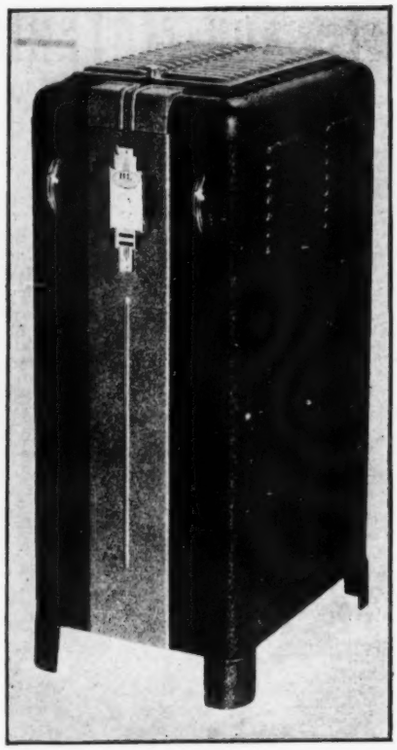
EXPLOSION-PROOF MOTOR—*U. S. Electrical Motors, Inc., Dept.* 23, 80 34*th St., Brooklyn, N. Y.* A vertical explosion-proof motor suitable for Class I, Group D, and Class II, Group G locations as defined by the National Board of Fire Underwriters has a fan-cooled motor with asbestos protected windings which permit operation at higher temperatures. Vol. 85, p. 134.

VARIABLE-SPEED A.C. DRIVE — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* With a capacity range from 1 to 15 hp., a simplified a.c. variable speed drive has been devised, suitable for a 10:1 speed range, which is especially adaptable to machine tools. Not shown. Vol. 85, p. 204.

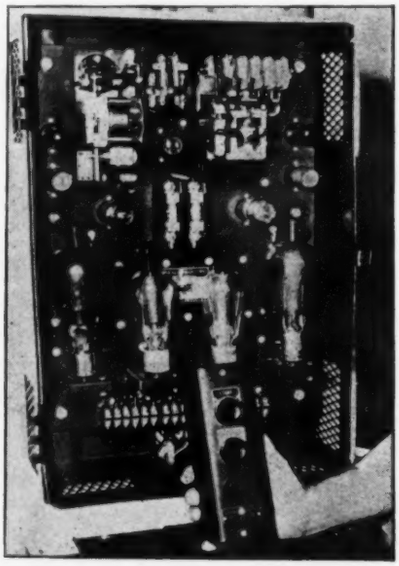
FRACTIONAL HORSEPOWER MOTORS—*General Electric Co., Schenectady, N. Y.* A new line of fractional horsepower motors of extremely sturdy construction are designed for machine tool and industrial applications. Not shown. Vol. 85, p. 206.



MULTI-BREAKER — *Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee, Wis.* The new 230-volt industrial Multi-Breaker, fuseless, with bimetallic strip actuation, visible trip indication, and trip-free lever, affords economical application as a motor circuit switch or service disconnect switch. Vol. 85, p. 778.

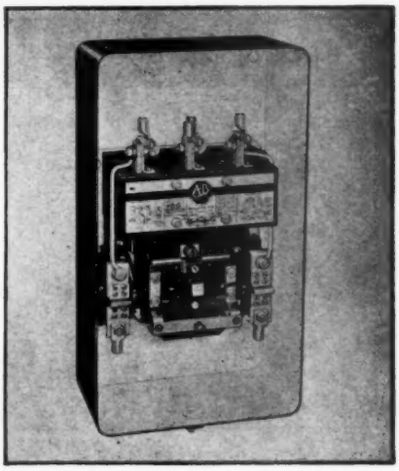


DRY PLATE RECTIFIERS—*Benwood Linze Co.,* 1815 *Locust St., St. Louis, Mo.* Compact, mobile dry plate rectifiers for electroplating are available in 300 and 500 amp. capacities at 6 and 12 volts. They operate from 230 and 440 volts, three phase, 60 cycle, A.C. supply circuits. Vol. 85, p. 896.

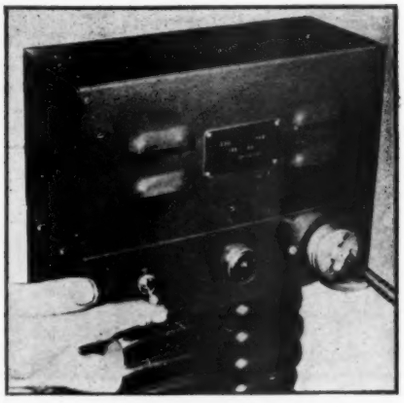


ELECTRONIC CONTROL SYSTEM—*General Electric Co., Schenectady, N. Y.* This electronic control system, which provides simple stepless control of d.c. motors from a.c. current lines, provides the means for electrically starting, stopping, accelerating and regulating the speed of a motor. Standard units will cover motor sizes up to 5 hp., 230 v. A.c. is changed to d.c. for the motor field and armature circuits by two pairs of thyratron tubes. Control compensates for changes in armature voltage drop, holding motor speed constant regardless of normal load and line voltage variations. Vol. 85, p. 1349.

MULTI-BREAKER—*Square D Co., Detroit, Mich.* A new industrial Multi-Breaker for use on 230-volt a.c. systems is compact, and has a dust-resisting inclosure with felt gasket between box and cover. Both 2- and 3-pole forms are available in capacities from 15 to 100 amp. Vol. 85, p. 564.



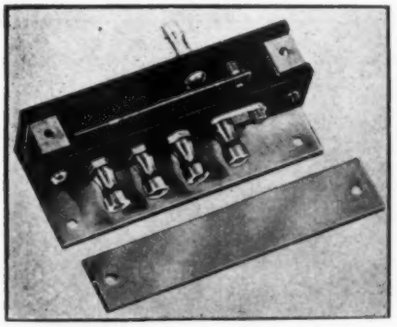
SOLENOID STARTER—*Allen Bradley Co.,* 1311 *S. First St., Milwaukee, Wis.* Incorporating all the features of the old solenoid starters, the Size 4, Bulletin 709 solenoid starter has a rating of 50 hp., 220 volts and 100 hp., 440-550-600 volts and will replace the older Bulletin 710, Size 4 clapper starter. Vol. 85, p. 512.



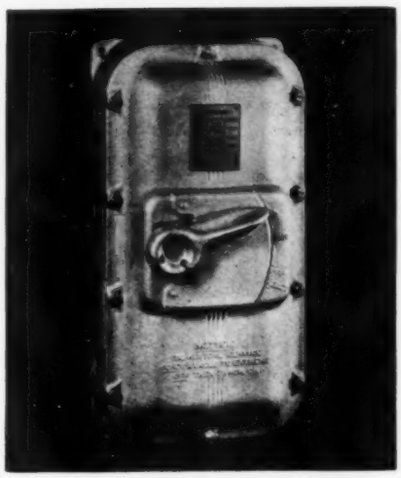
RECTIFIER—*Savage Tool Co., Savage, Minn.* This Doall rectifier for transforming alternating current into direct current for the operation of electro-magnetic chucks from 6 × 18 in. to 8 × 24 in. in size is operated from a toggle switch and contains a built-in pilot light to show when it is in operation. Vol. 85, p. 1296.

VOLTAGE REGULATOR — *General Electric Co., Bridgeport, Conn.* Principal feature of 500-amp. fan-cooled, copper-oxide rectifier for electroplating with separate voltage regulator, is that the "on load" control permits adjustment during operation. Vol. 85, p. 780.

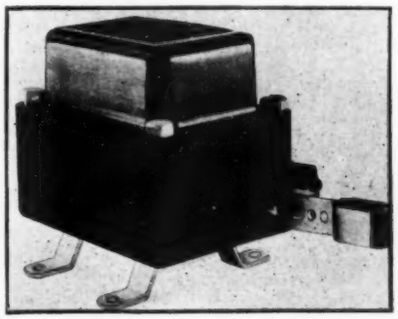
MULTI-BREAKER — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* This low-cost multi-breaker is offered for use on any normal duty application that would otherwise require fuses or fuse switches. Type M-1 and M-2, 15 to 100 amp., two or three pole breakers are for use on a.c. circuits up to 230 volts. Inclosure is dust resisting. Vol. 85, p. 736.



TIME DELAY SWITCH—*Betts & Betts Corp., New York, N. Y.* Available in immediately or not immediately recycling types and in normally open or normally closed contact types, this time delay switch has been developed to provide a predetermined time delay in electrical control. Vol. 85, p. 515.



CIRCUIT INTERRUPTER — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* Circuits in outdoor, damp, wet, or dusty locations can safely be disconnected or interrupted by a new non-automatic inclosed De-ion circuit interrupter. Vol. 85, p. 778.

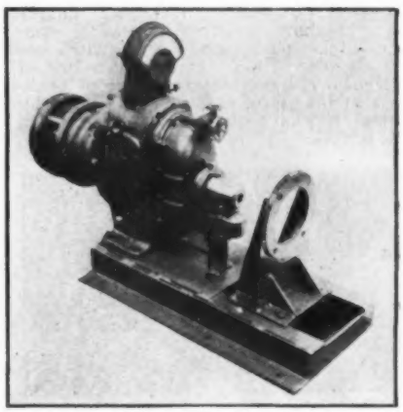


FLOAT SWITCHES—*Square D Co., 6060 Rivard St., Detroit, Mich.* Explosion-resisting and water-tight float switches are made for 110 to 550 volts a.c. or d.c. The water tight switch has rubber gasket between cover and base. The explosion-resisting switch has surfaces between cover and base carefully machined. Vol. 85, p. 948.

SWITCH—*Micro Switch Corp., Freeport, Ill.* A metal-clad Micro Switch with a roller arm adjustable vertically around its pivot pin, and also horizontally in eight positions, is suitable for slide or cam actuation. Switch is rated by Underwriters' at 1,200 watts up to 600 volts a.c. Vol. 85, p. 192.

CONTROLLERS—*Cutler-Hammer, Inc., 315 N. Twelfth St., Milwaukee, Wis.* Bulletin 14951 cam-operated mill duty controllers, available in two-speed, three-speed and multi-speed types, are ideal for mill auxiliaries, crane hoist, bridge and trolley applications. Vol. 85, p. 414.

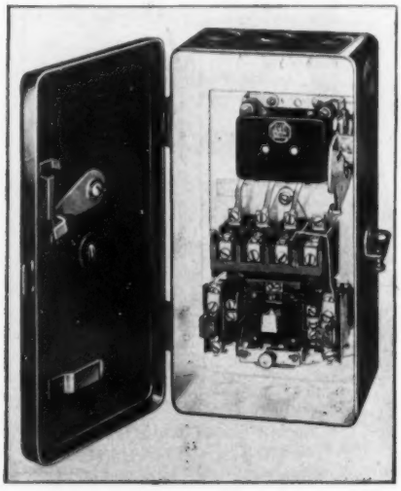
RECTIFIER — *Electron Equipment Corp., Palm Springs, Calif.* Direct current for operating adjustable-speed d.c. motors, magnetic chucks, and signal systems is easily obtained with industrial rectifiers. Vol. 85, p. 630.



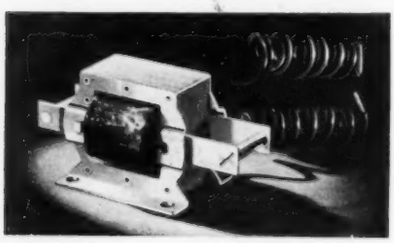
TEST RIG — *Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill.* The P.I.V. gear positive infinitely variable speed test rig has been developed especially for production testing of generators and similar equipment. Vol. 85, p. 184.

PARTS and MATERIALS—Electric Controls

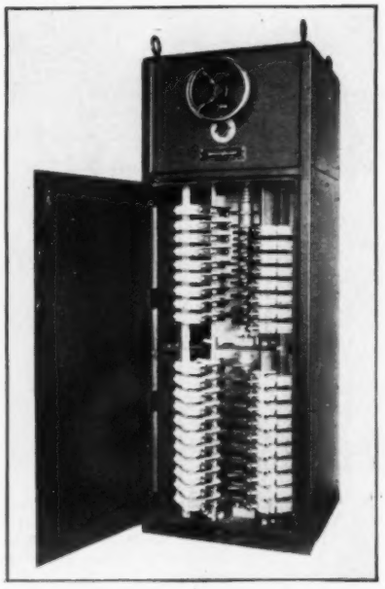
CAPACITOR — *Industrial Instruments, Inc., 156 Culver Ave., Jersey City, N. J.* The Type DK Decade capacitor provides a choice of any capacity value from 0.01 to 11.1 mfd. steps, or other ranges. Etched metal panel has three knobs and dial. Vol. 85, p. 1350.



STARTERS—*Allen-Bradley Co.*, 1311 *S. First St., Milwaukee, Wis.* The unique handle-locking arrangement and a compact high-capacity disconnect switch are among several new features of a line of Bulletin 712 combination starters available in four sizes and a variety of inclosures, with or without fuse switch. Vol. 85, p. 680.

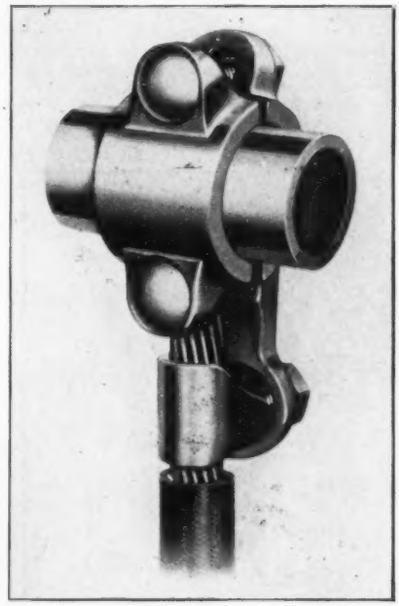


SOLENOID—*John S. Barnes Corp.*, 301 *S. Water St., Rockford, Ill.* This improved solenoid designed primarily for machine tools cannot be harmed by oil or coolant; the cloth taped coil is impregnated with oil and water resistance varnish. Vol. 85, p. 784.

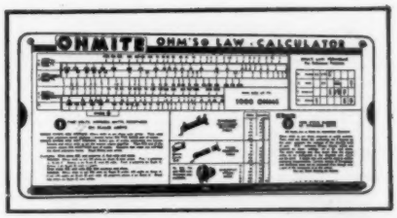


MOTOR-OPERATED CONTROLLER —*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* For use with polyphase wound-rotor motors on fan, pump, and similar drives, this SC controller provides either 13 or 20 balanced points of control by varying the resistance in the motor winding. The motor may be supplied for 115 or 230 volts d.c. and 110, 220 or 440 volts a.c. Vol. 85, p. 468.

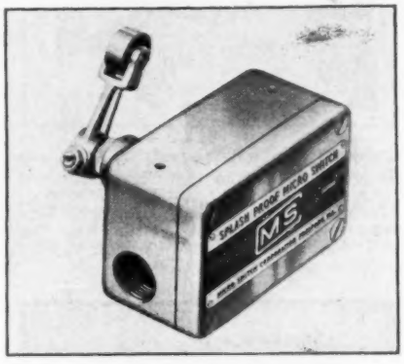
TRANSFORMER — *Transformer Div., Westinghouse Electric & Mfg. Co., Sharon, Pa.* Use of "Hi-persil" magnetic steel for transformer cores permits reducing the size of these units by about one-third, with corresponding reduction in the amount of copper required. Not shown. Vol. 85, p. 470.



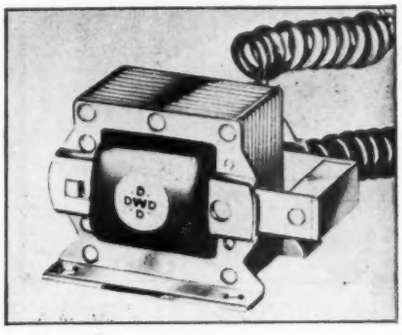
T-CONNECTOR — *Burndy Engineering Co., Inc., 107 Eastern Blvd., New York, N. Y.* An all-clamp T-connector for tapping cable from tubing has flattened U-bolt on tap which accommodates a large range of cable sizes. Compressive range of U-bolt makes it suitable for clamping flexible and extra-flexible cables. Where mechanical stresses are great, two U-bolts may be used. Vol. 85, p. 1346.



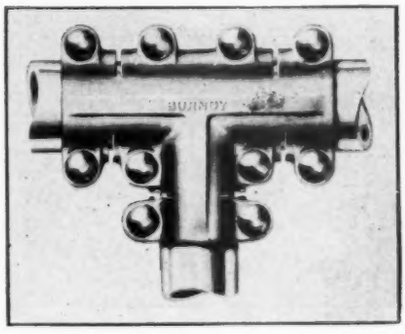
CALCULATOR—*Ohmite Mfg. Co., 4835 Flournoy St., Chicago, Ill.* A handy calculator to give the answer to any Ohm's law problem has been developed to give the answer quickly with one setting of the slide. All values are direct reading. Vol. 85, p. 138.



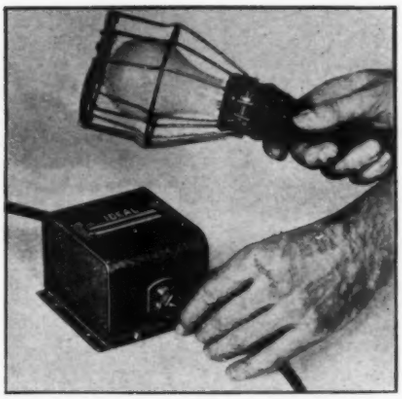
SWITCH — *Micro Switch Corp., Freeport, Ill.* A splash-proof housing is now furnished for the standard Bakelite Micro Switch, for use where closely held operating points and movement differentials are needed and where any splashing may occur. Vol. 85, p. 736.



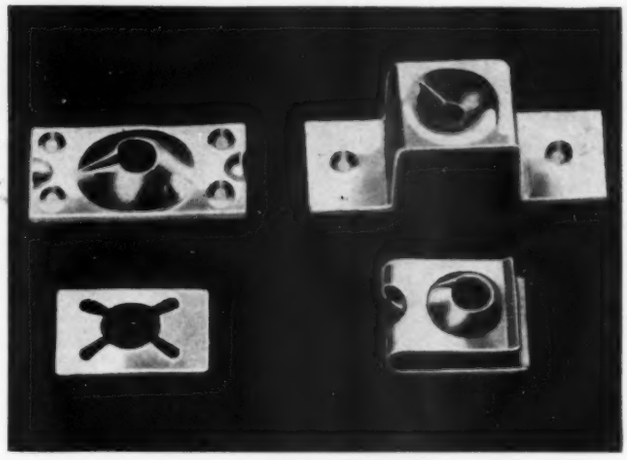
SOLENOID—*Dean W. Davis & Co., Inc., 549 W. Fulton St., Chicago, Ill.* Made for any voltage, this compactly designed solenoid for control of production machinery has a minimum push or pull of 5.5 lb. at full line voltage, and 3.75 lb. at 85 per cent of line voltage. Vol. 85, p. 1294.



T-CONNECTOR — *Burndy Engineering Co., Inc., 459 E. 133rd St., New York, N. Y.* A multigraph type T-Connector, Type NST, for tubing, run and tap is available in aluminum and aluminum-to-copper combinations in sizes from ⅜ to 6 in. Vol. 85, p. 1296.



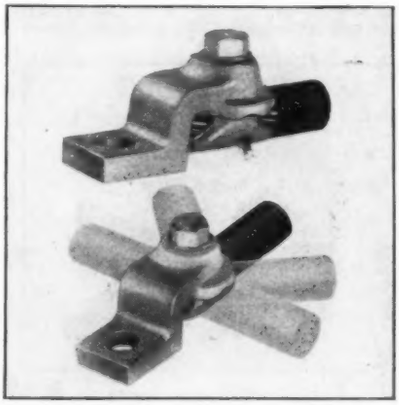
STEP DOWN TRANSFORMERS — *Ideal Commutator Dresser Co., 1057 Park Ave., Sycamore, Ill.* Equipped with a 10 ft., three-conductor type safety primary cord this step down transformer is easily plugged in between the power supply and the light cord extension to reduce extension voltage to 6 volts. Vol. 85, p. 1296.



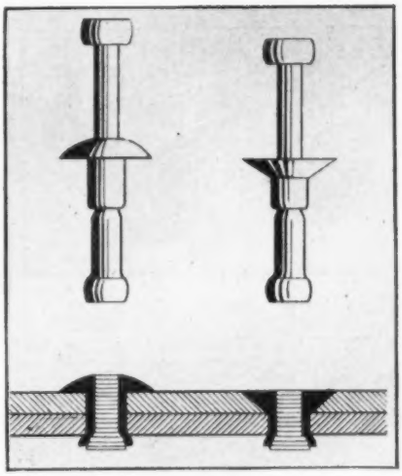
LOCKNUTS — *Central Screw Co., 3501 S. Shields Ave., Chicago, Ill.* Designed especially for application in the aircraft industry, the "Vibrisist" locknuts have full constant pitch threads, and apply fatigue-proof pressures. Vol. 85, p. 1022.

CONDUIT CASE — *Mu-Switch Corp., Canton, Mass.* Type D Mu-Switch is available in a cast metal housing for installation in conduit wiring systems. For industrial and machine tool applications, the housing is of bronze with hub tapped for ½-in. pipe thread; for aircraft application, an aluminum case is used with male ¾-in—20 thread. Vol. 85, p. 780.

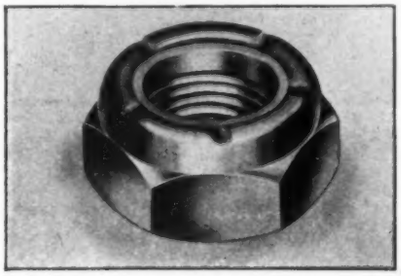
FITTINGS—*American Phenolic Corp., 1250 Van Buren St., Chicago, Ill.* Two types of "Amphenol" electrical fittings have been developed especially for aircraft use. Series AN electrical connectors are available in four types and eighteen different sizes. The line of aluminum alloy conduit fittings comprise twelve classes and 130 pieces and is made for standard rigid or flexible aluminum conduit. Not shown. Vol. 85, p. 94.



CABLE CONNECTOR—*Burndy Engineering Co., 459 E. 133rd St., New York, N. Y.* A rotatable cable clamp is featured in Type EA "Verislug" cable connector. Only six sizes are necessary to take conductors from No. 8 stranded cable to conductors of 1,000 cm. Vol. 85, p. 42.

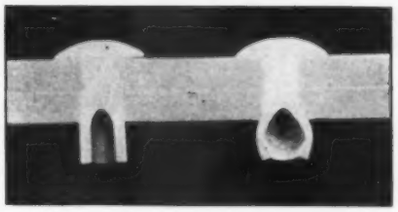


BLIND RIVETING—*Cherry Rivet Co., Los Angeles, Calif.* These self-plugging rivets have a mandrel with an expanded section and head on the blind side. The expanded section is pulled into the hollow member and forms a tulip head on blind side. The operation is performed with either a hand-operated or an automatic gun. Vol. 85, p. 1290.

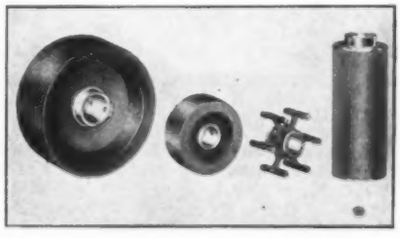


THIN HEX NUTS—*Elastic Stop Nut Corp., 2332 Vauxhall Rd., Union, N. J.* For use on shear bolts where a high degree of the stress is lateral, and for general application to light and medium stress fastenings, an improved line of thin hex nuts are available in steel, brass and aluminum in a complete range of standard sizes. Vol. 85, p. 512.

CIRCUIT BREAKER — *Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.* The Type AB-1 "De-Ion" inclosed circuit breaker, for protection of all light and power circuits, is made in four frame sizes, and in ratings from 15 to 600 amp. in steps corresponding to commercial wire sizes. Not shown. Vol. 85, p. 369.



EXPLOSIVE RIVETS—*E. I. du Pont de Nemours & Co., Wilmington, Del.* A new type of explosive rivet has a high explosive charge secreted in a cavity at the end of the shank. Heat applied to the rivet head by an electric "gun" detonates the charge. The explosion expands the charged end of the shank, thus forming a "blind" head and setting the rivet. The new rivets can be headed by one workman at a rate of 15 to 20 rivets a minute, once they are inserted in the holes. Vol. 85, p. 729.

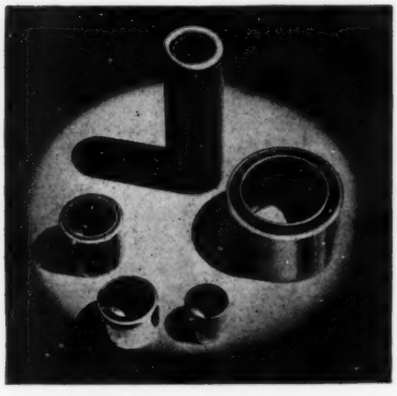


FIBER ROLLS—*Rockwood Mfg. Co., 1801–2001 English Ave., Indianapolis, Ind.* Improved fiber rolls vary from 1½ to 24 in. in diameter, with faces up to 4 ft. wide and come in rolls up to about 5-in. diameter and 9-in. width. Vol. 85, p. 39.

PARTS and MATERIALS—Bearings

STATIONARY NUTS — *Elastic Stop Nut Corp., 2332 Vauxhall Rd., Union, N. J.* Stationary nuts for blind mounting applications on general industrial equipment are offered in a wide range of size, material and threads. Vol. 85, p. 1176.

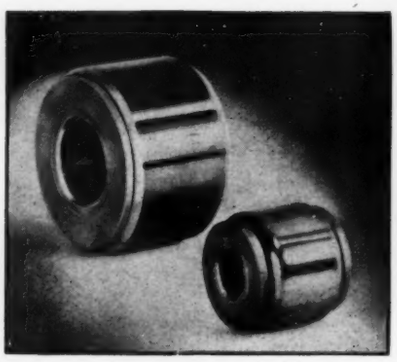
FLAT-HEAD CAP SCREW—*Allen Mfg. Co., Hartford, Conn.* "Pressur-Formd" socketed flat-head cap screws have been developed for assemblies requiring a socketed screw which will set up flush and stay tight when countersunk. Vol. 85, p. 207.



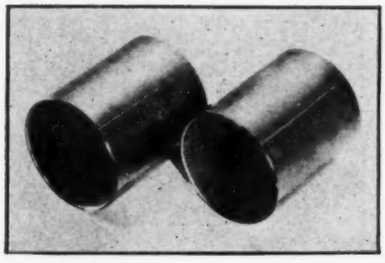
BEARINGS—*Harris Products Co., 5408 Commonwealth Ave., Detroit, Mich.* Increased resistance to pounding and shock, a comparatively low coefficient of friction, and a considerably wider range of sizes and shapes on shorter notice than the older cast styles, are features of a line of Torflex bearings. Vol. 85, p. 786.

BEARINGS — *Curtis Development & Mfg. Co., 3266 N. 33rd St., Milwaukee, Wis.* Inside diameters from 1.125 to 4,000 in. are available in the Evans "Fusion Bonded" steel backed, babbitt lined bearing with high load-carrying capacity at elevated temperatures. Not shown. Vol. 85, p. 323.

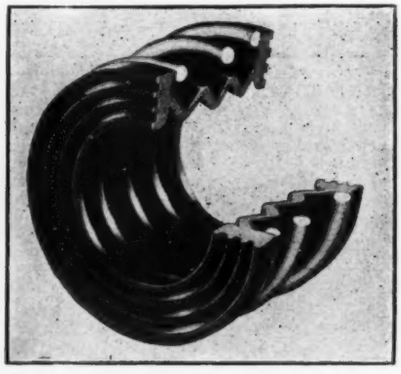
FLEXIBLE BUSHINGS—*Harris Products Co., 5416 Commonwealth Ave., Detroit, Mich.* Problems of noise, vibration, lubrication, impact, shock and shaft misalignment are eliminated by the use of "Torflex" flexible bushings. Not shown. Vol. 85, p. 141.



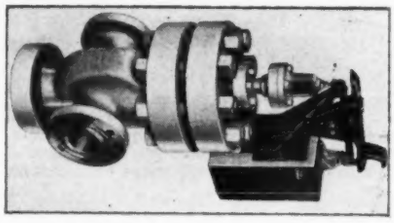
NEEDLE BEARINGS—*Torrington Co., Torrington, Conn.* There are two series of needle bearing assemblies, designated as the AR Series for normal service and the AT Series for heavy duty. Vol. 85, p. 370.



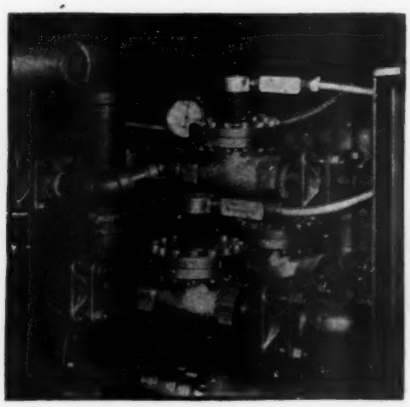
BEARINGS—*Johnson Bronze Co., New Castle, Pa.* The "Bronze-on-Steel" bearing is a thin wall, laminated type that combines good bearing qualities with the strength of steel. Vol. 85, p. 684.



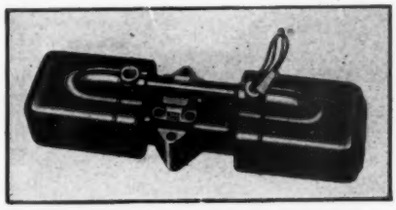
WATER PUMP SEAL—*Crane Packing Co., 1800 Cuyler Ave., Chicago, Ill.* This new water pump seal is composed of two parts—bellows and spring. Serrated contact facings are responsible for the positive seal. Vol. 85, p. 1294.



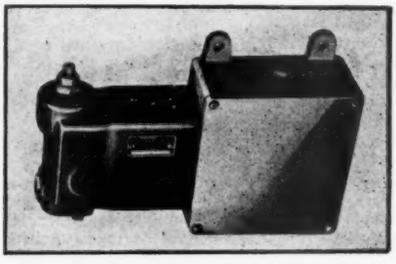
POWER CONTROL VALVES — *Manning, Maxwell & Moore, Inc., Bridgeport, Conn.* Power control valves for high pressure steam installations from 1,800 to 2,500 lb. may be set for 1 per cent or less difference between opening and closing pressure. Vol. 85, p. 1240.



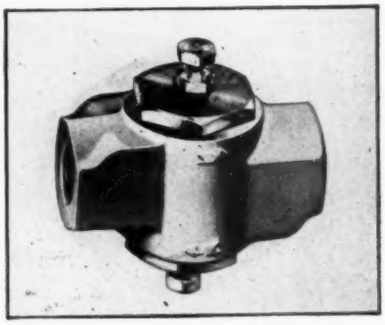
HIGH PRESSURE VALVES — *E. C. Atkins & Co., 402 S. Illinois St., Indianapolis, Ind.* High pressure valves for operating pressures up to 3,000 lb. have been added to the Atkomatic line. Available in ½, ¾ and 1½ in. sizes, valves are bronze with renewable seats and disks. Vol. 85, p. 1296.



SOLENOID-OPERATED VALVES — *Vickers, Inc., 1400 Oakman Blvd., Detroit, Mich.* Three general types of solenoid-operated valves, standard threaded pipe connection models, flange pipe connection models, and a gasket mounted design, are available for electric-hydraulic control applications in sizes from ¼ to 3-in. standard pipe sizes. Vol. 85, p. 466.

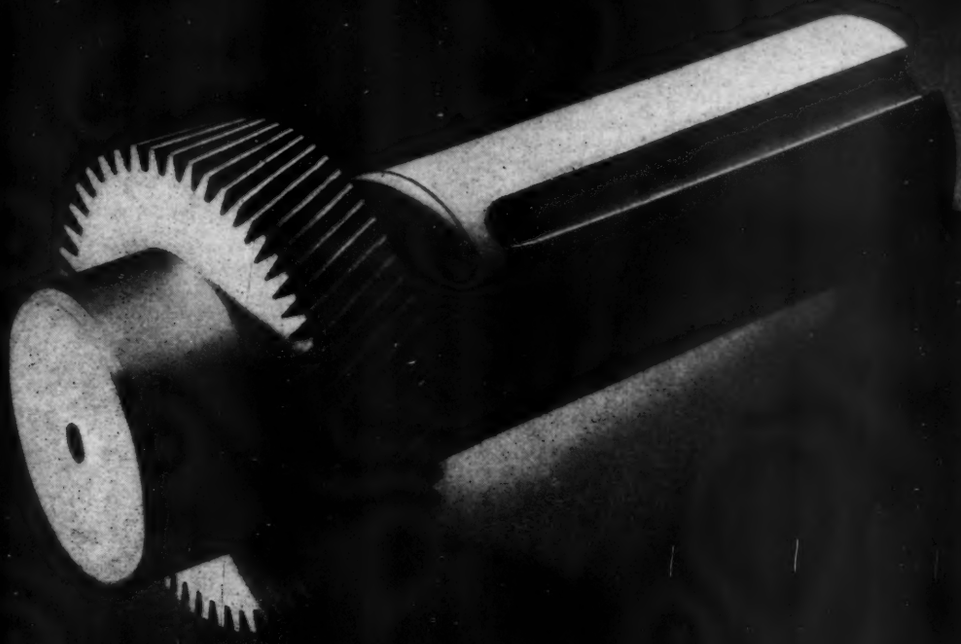


HYDRAULIC PRESSURE SWITCHES —*Vickers, Inc., 1400 Oakman Blvd., Detroit, Mich.* This sensitive pressure switch for hydraulic equipment is available for operating pressures up to 3,000 lb. per sq. in. It may be used with oils of various viscosities. Vol. 85, p. 414.



SPEED CONTROL VALVE — *Hanna Engineering Works, 1765 Elston Ave., Chicago, Ill.* Available in ⅛, ¼, ⅜, ½, ¾ and 1 in. pipe sizes, recommended for 250 lb. pressure, the two-direction speed control valve has been developed for dependable speed control of pneumatically actuated cylinders. Vol. 85, p. 514.

Chrome-moly steels speed production and lower costs



A manufacturer of speed reduction gear pinions is taking advantage of two of the outstanding advantages of Chromium-Molybdenum (4140) steel – uniform hardening in heavy section, and excellent machinability at intermediate hardnesses.

Pinion and shaft are machined integral from a 4140 round oil quenched and tempered to about 150,000 p.s.i. tensile and 300 B.H.N.

Uniformity in hardness of the heat treated bar assures adequate strength in the shaft even though its diameter is only about half that of the pinion. This integral construction eliminates an assembly operation and makes for better performance.

Send for our free technical book, "Molybdenum in Steel". It contains helpful data on Molybdenum steels that may be of assistance in your own problems.

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Climax Mo-lyb-den-um Company
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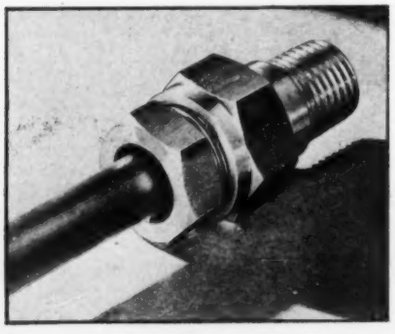
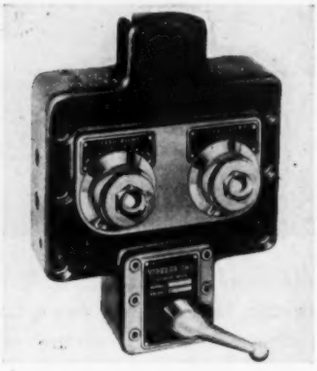
MOLY

HYDRAULIC MACHINE CONTROL—*Vickers, Inc.*, 1400 *Oakman Blvd., Detroit, Mich.* Remote automatic machine cycle control is featured in this traverse and feed control panel. Unit is entirely solenoid-controlled and designed for cycles incorporating rapid advance, feed, rapid return and stop. Vol. 85, p. 270.



RIGID TUBE FITTINGS — *Harris Products Co.*, 5416 *Commonwealth Ave., Detroit, Mich.* For high pressure fluid transmission, the "Sealflex" tube fittings permit vibratory flexing of rigid tubes to 10 deg. included angle. Vol. 85, p. 900.



TRAVERSE AND FEED CONTROL—*Vickers, Inc.*, 1400 *Oakman Blvd., Detroit, Mich.* Operating cycles for machine tool tables or heads which require rapid advance and feed in both directions of motion are provided in this hydraulic control panel. Vol. 85, p. 203.

LUBRICATING OIL — *Colonial Esso Marketers*, 26 *Broadway, New York, N. Y.* A lubricating oil which does its work, then vanishes without a trace, "Caloria" spreads to only four or five times its original area when dropped on a surface heated to 400 F. For cases where lubricant cannot be re-applied before complete evaporation takes place, use of "Van Caloria," which incorporates colloidal graphite, causes a thin layer of graphite to remain on the bearings after complete disappearance of the petroleum lubricant. Not shown. Vol. 85, p. 469.

"NONSCRATCH" LUBRICANT — *Wayne Chemical Products Co.*, 9450 *Copeland Ave., Detroit, Mich.* No. 1025 "Nonscratch" lubricant has been developed especially for drawing cartridge cases. Not shown. Vol. 85, p. 576.

LIGHT WEIGHT DIES — *Masonite Corp.*, 111 *West Washington St., Chicago, Ill.* Masonite stock for making inexpensive light weight dies. This material comes in sheets 48 × 72 or 144 in. and in nine thicknesses.

MARKING PENCILS — *Joseph Dixon Crucible Co., Jersey City, N. J.* Purple and green have been added to the line of Phano grease pencils used largely for marking highly polished metal without danger of scratching or scoring. Not shown. Vol. 85, p. 1300.

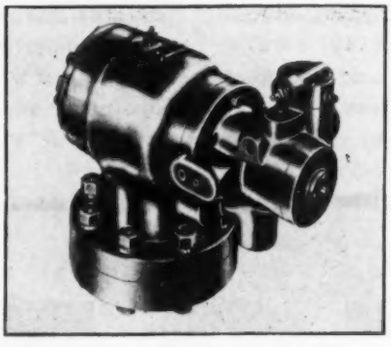
EXTRUDED PLASTIC—*R. D. Werner Co.*, 380 *Second Ave., New York, N. Y.* "Plastikmould" and "Plastiktrim" extruded plastic shapes are available to take the place of many types of aluminum trim which may soon become difficult to obtain. Not shown. Vol. 85, p. 370.

PLASTICS—*Chicago Extruded Plastics Co., Chicago, Ill.* Low die cost, which makes practical even comparatively short runs, are among the advantages of improved methods and facilities to extrude plastics in continuous lengths and innumerable cross-sectional patterns. Not shown. Vol. 85, p. 417.

PHENOLIC PLASTIC—*Durez Plastics & Chemicals, Inc., Walck Road, North Tonawanda, N. Y.* A new general-purpose phenolic molding compound known as "Durez 775 Black" was developed to make available a plastic which would have a wider range of application than existing general-purpose ones. Not shown. Vol. 85, p. 470.

TIRE COMPOUND — *United States Rubber Co.*, 1230 *Sixth Ave., New York, N. Y.* Substantial power savings in industrial trucks are made possible through the low rolling resistance of a new rubber compound for industrial tires known as General Purpose Compound. Not shown. Vol. 85, p. 634.

CONCRETE DYE — *Truscon Laboratories, Box* 69, *Milwaukee Junction P. O., Detroit, Mich.* "Flor-Dye No-Buff" concrete floor dressing is claimed to permanently color and dustproof concrete floors without the necessity of polishing. Not shown. Vol. 85, p. 34.

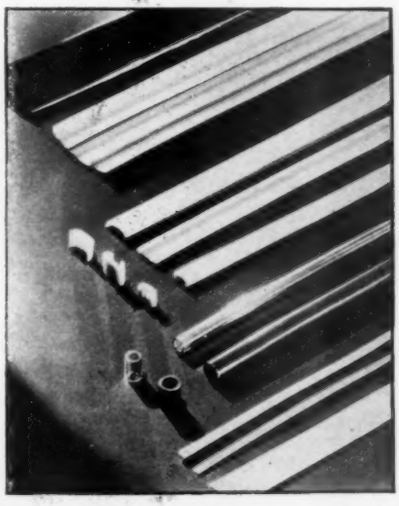


HYDRAULIC PRESS CONTROL — *Vickers, Inc.*, 1400 *Oakman Blvd., Detroit, Mich.* Elimination of shock in operation of hydraulic presses is featured in the design of this pressure-actuated prefill surge valve designed for operating pressures up to 3,000 lb. per sq. in. Vol. 85, p. 268.

CONCRETE PATCHING COMPOUND—*Truscon Laboratories, Box* 69, *Milwaukee Junction P. O., Detroit, Mich.* Supplied in 10-lb. cans and 50-lb. drums, only water need be added to "Floor-Patch" to repair holes, ruts and worn places in concrete floors. This compound produces a non-shrinking patch. Not shown. Vol. 85, p. 523.

LIGHTWEIGHT AIR HOSE—*United States Rubber Co., Rockefeller Center, New York, N. Y.* Strength has not been sacrificed by lightening the new air hose which now weighs only 20 lb. per 110 ft., cutting in half the load to be carried by workers handling pneumatic tools. Not shown. Vol. 85, p. 682.

LIGHTWEIGHT AIR HOSE—*B. F. Goodrich Co., Akron, Ohio.* Stocked in ½ and ¾-in. sizes, a new lightweight air hose so flexible that the ½-in. size can be bent to a 3-in. radius without collapsing or cutting off the air supply can withstand pressure from 80 to 125 lb. per sq. in. Not shown. Vol. 85, p. 730.



PLASTIC MOLDING—*Detroit Macoid Corp., Detroit, Mich.* A process has been developed by which it is possible to manufacture individually designed moldings, strips, tubing, rods, etc., in continuous lengths rather than in strips or limited length. Vol. 85, p. 142.

EXHAUST HOSE—*B. F. Goodrich Co., Akron, Ohio.* Manufactured in sizes ranging from 2 to 12 in. in diameter, in 8, 15 and 25 ft. lengths, a line of specially constructed exhaust hose has been developed for conducting fumes and abrasive dust. Not shown. Vol. 85, p. 326.

MOTOR MICA — *Scientific Lubricants Co.*, 3462 *N. Clark St., Chicago, Ill.* When added to lubricants "Motor Mica" will reduce friction and temperature in engine and machinery operations and will reduce grease and oil consumption. Not shown. Vol. 85, p. 1076.

FLOOR HARDENER—*Truscon Laboratories, Box* 69, *Milwaukee Junction P. O., Detroit, Mich.* Granitex, a varnish type transparent concrete floor hardener and finishing material provides an easy-to-clean, oil-proof, dustless surface on cement floors. Not shown. Vol. 85, p. 1122.

SYNTHETIC SPONGE RUBBER—*B. F. Goodrich Co., Akron, Ohio.* A synthetic sponge rubber made of Ameripol will resist oil, grease and other solvents which would deteriorate natural rubber, and will also stand up under high temperatures. Not shown. Vol. 85, p. 1076.

AVAILABLE FOR PROMPT DELIVERY

With production schedules constantly endangered by non-delivery of essential materials, the elimination of even one such problem is a valuable aid in maintaining maximum output. Torrington Needle Bearings are available for *prompt* shipment on your priority orders!

Right from the start, steadily rising sales curves reflected industry's immediate recognition of the Needle Bearing's advantages. Long before defense requirements brought increasing demands for most industrial materials, Torrington was prompted to expand production capacity again and again, to anticipate growing use of the Needle Bearing. So broad was the scope of this expansion program, initiated in the light of the Bearing's demonstrated potentialities in normal times and its acceptance by so many of the country's leading engineers, that it has proved sufficiently flexible to care for the abnormal requirements of the present.

Manufacturers of aircraft, automotive equipment, textile machinery, farm implements, electrical apparatus, and many other products have put the Needle Bearing to work in thousands of applications, because of such conspicuous features as low cost, small size, high capacity, ease of installation, efficient lubrication. And today the Needle Bearing has a new and even more important appeal—its ready availability to the makers of defense equipment and machines.

You can avoid delays by incorporating the Needle Bearing in your designs *now*—and you can profit as well by its adaptability to the solution of a wide range of bearing problems. Torrington engineers will be glad to work with you in incorporating the advantages of the Needle Bearing in your product. For full details on this unusual bearing, write for Catalog No. 105.

THE TORRINGTON COMPANY
TORRINGTON, CONN., U. S. A. • *Estab. 1866*
Makers of Needle and Ball Bearings
New York Boston Philadelphia Detroit
Cleveland Chicago Los Angeles Seattle
San Francisco Toronto London, England

TORRINGTON NEEDLE BEARING

REDUCTION IN WEIGHT

and availability when needed are among the outstanding reasons for the use of Needle Bearings in many aircraft applications. A typical instance is its use on the cowl flap control rod of P-40 pursuit planes built by Curtiss-Wright Corporation.

CURTISS—WRIGHT

COMPLETE RELIABILITY

is essential in such materials handling equipment as the Towmotor Lift Truck, which is subjected to severe service and heavy loads. Towmotor assures reliable bearing performance by using Needle Bearings on steering axle and hydraulic lifting cylinder crosshead.

TOWMOTOR LIFT TRUCK

HIGH CAPACITY IN SMALL SPACE

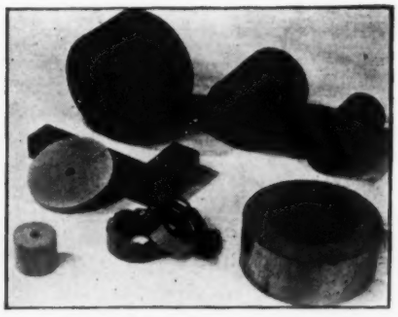
is obtained by the use of Torrington Needle Bearings on the rocker shaft of Class 2600 Governors built by The Pickering Governor Company. Compactness of the Needle Bearing contributes to simplification in product design and to accurate governor operation.

PICKERING GOVERNOR

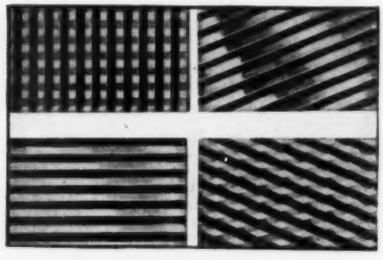
PARTS and MATERIALS—Processes

REPLACEMENT FOR ALUMINUM—*United States Rubber Co.*, 1230 *Sixth Ave., New York, N. Y.* Formula C-102 is a non-metallic material, one-third lighter than aluminum and designed to replace that metal in many defense applications. Not shown. Vol. 85, p. 1076.

CELLULAR RUBBER—*United States Rubber Co.*, 1230-6th *Ave., New York, N. Y.* Cellular rubber is a new material of high insulation value that is twice as light as cork. Two weights of the U. S. Royal insulation board are to be manufactured: 4.5 lb. per cu. ft. and 5.5 lb. per cu. ft. for 1 in. thick material. Not shown. Vol. 85, p. 838.



HIGH FREQUENCY CORES—*Henry L. Crowley & Co., 1 Central Ave., West Orange, N. J.* Large sized and special shaped iron high frequency cores are produced for fine instruments, induction furnaces and X-ray apparatus among other equipment. Vol. 85, p. 1301.



CRIMPED METALS—*American Nickeloid Co., Peru, Ill.* Several new crimped designs in bonded pre-finished metals are available in horizontal, diagonal, square, and diamond patterns in a variety of metal thicknesses in sheet sizes up to 24 × 36 in. in most patterns. Vol. 85, p. 632.

LAMINUM SHIM STOCK—*Laminated Shim Co., Union St., Glenbrook, Conn.* Sheets of Laminum now available in sizes up to 7 × 36 in. permit the company to manufacture larger jointless shims and afford the same convenience to purchasers of Laminum shim stock who cut their own shims. Not shown. Vol. 85, p. 738.

METAL FILTERS—*Moraine Products Div., General Motors Corp., Dayton, Ohio.* Porex is a porous metal whose chief functions are to break up into small streams or masses the main flow of fluids, to remove undesirable materials, to separate two fluids, to serve as a diffusing medium in bringing fluids and gases into intimate contact under controlled conditions. Not shown. Vol. 85, p. 684.

METAL CEMENT—*St. Louis Rubber Cement Co.*, 3948 *W. Pine St., St. Louis, Mo.* Available in various sized containers, "Griptite" metal cement is particularly suitable for applying rubber, felt, cardboard and other non-metallic materials to metal. "Presto" vulcanizing cement is suitable for use in the aircraft industry. Not shown. Vol. 85, p. 325.

BABBITT METAL — *Magnolia Metal Co.*, 120 *Bayway, Elizabeth, N. J.* A babbitt metal with a tensile strength of 17,500 lb. per sq. in. and a yield point of 6,500 lb. per sq. in. has a brinell hardness of 27 and its pouring temperature ranges from 95 to 1,000 F. Its strength makes the metal adapted to heavy bearing loads. Not shown. Vol. 85, p. 1302.

BEARING GREASES—*Gulf Oil Corp., Gulf Building, Pittsburgh, Pa.* Two new types of lubricating greases for ball and roller bearings are Gulf Anti-Friction Grease, recommended for heavy duty service, and Gulf Precision Grease, recommended for lighter duty and higher speeds. Not shown. Vol. 85, p. 275.

DE-GUMMED CASTOR OIL—*Pawling Refining Corp., Port Chester, N. Y.* With the Paluszek process gum is eliminated from castor oil producing greater lubricity and wetness caused by its ability to lower the surface tension. Not shown. Vol. 85, p. 143.

ALUMINUM LUBRICANTS — *Wayne Chemical Products Co.*, 9450 *Fulton St., Detroit, Mich.* No. 4 aluminum drawing oil is a viscous lubricant that does not "squeeze out" under the great pressures exerted in deep drawing thin sheets of aluminum. No. 2 aluminum cutting oil is a very thin oil that provides lubricating properties to insure quality machining. Not shown. Vol. 85, p. 682.

FIBRATED LEATHER GASKET — *Armstrong Cork Co., Lancaster, Pa.* Fibrated leather gasket material recommended for sealing oil, water or gasoline, may also be used for other general gasketing where temperatures do not exceed 300 F. and where acids or alkalis are not encountered. Material is supplied in rolls and sheets in standard widths up to 48 in. Special shapes die-cut to specifications will also be supplied. Known as Armstrong's No. 841, material is compressible, has high percentage of recovery and takes a minimum amount of permanent set. Not shown. Vol. 85, p. 1354.

NICKEL ALLOY—*International Nickel Co.*, 67 *Wall St., New York, N. Y.* "KR Monel" high-nickel alloy has high strength, high corrosion resistance, is capable of fabrication in automatic screw machines, and capable of heat-treatment after fabrication to provide an extra measure of strength and hardness. The alloy is available in rod and wire forms only. Not shown. Vol. 85, p. 95.

BLACKENING PROCESS — *Enthone Co.*, 442 *Elm St., New Haven, Conn.*, Used for blackening zinc plated or hot galvanized surfaces, as well as for solid zinc or its alloys, an immersion process called "Ebonol Z", consists of immersing the zinc or zinc alloy in a 1 lb. per gal. solution of "Ebonol Z" salts at a temperature of 150 to 212 F. An adherent, jet-black finish is formed in 1 to 5 min. Not shown. Vol. 85, p. 524.

FABRIC ATTACHING TOOL — *Bell Aircraft Corp.*, 2050 *Elmwood Ave., Buffalo, N. Y.* Fabric attachment to aircraft by use of a special tool which forces thin retainer strips into extrusions in the rib construction cuts production costs, increases speed, and provides a stronger attachment than obtained by conventional methods. Vol. 85, p. 1120.

MARKING INK—*Acromark Corp.*, 251–257 *N. Broad St., Elizabeth, N. J.* An ink that can be furnished in any standard color is available for marking Vinylite. It is compounded in a paste form and is used as a regular printing ink. Not shown. Vol. 85, p. 634.

BLACKENING PROCESS — *E. F. Houghton & Co., Philadelphia, Pa.* "Houghto-Black," the blackening process for steel parts, is a low-temperature salt which is mixed with water and held at the boiling point of the solution (around 290 deg. F.), while the parts to be blackened are dipped into the bath. Not shown. Vol. 85, p. 575.

COPPER PLATING — *United Chromium, Inc.*, 51 *E. 42nd St., New York, N. Y.* With a new time and labor saving Unichrome alkaline copper plating process, smooth fine grained deposits can be plated to thicknesses of 0.001 in. or more. It buffs easily, with minimum pressure and is often used without buffing prior to bright nickel plating. Bath operates at moderate temperatures and is non-corrosive. Not shown. Vol. 85, p. 787.

MARKING ENAMELED METALS—*Acromark Corp.*, 251-257 *N. Broad St., Elizabeth, N. J.* A method for marking enameled metals, requiring the use of a specially engraved die, hardened and tempered, and resulting in a mark as permanent as the enamel, has been announced. The die may be an engraved roller or a flat one, and the material to be marked determines the area practical to mark. Not shown. Vol. 85, p. 682.

"TEMPOBRAZING" — *Thomson-Gibb Electric Welding Co.*, 164 *Pleasant St., Lynn, Mass.* By employing accurately metered electrical energy and special solder having a flow temperature low enough to make excessive heating unnecessary, "Tempobrazing" makes possible the accurate dual control of both the amount and time of heat application for brazing cold-worked nonferrous materials without losing the hardness or temper that occurs in and around the joints. Not shown. Vol. 85, p. 682.

COLD DRAWN SHAPES

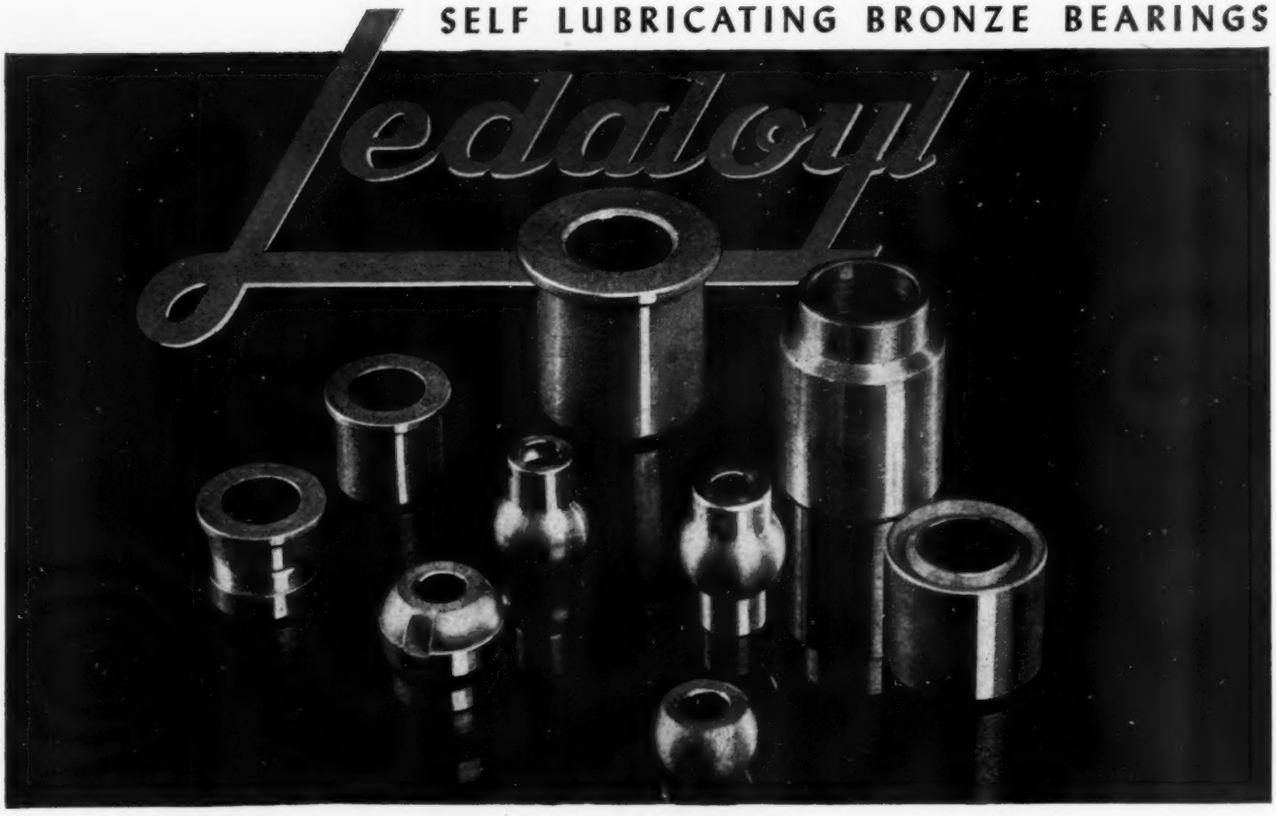
bright, smooth, accurate—special cold drawn steel sections save machining in countless applications for industrial development and defense.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS
PITTSBURGH, PENNSYLVANIA

SELF LUBRICATING BRONZE BEARINGS



SUBSTITUTION

offers an unusual opportunity

to IMPROVE

★ As the big job of arming the nation strains the resources of the country, many manufacturers are finding it necessary to seek substitutes in the production of their product. This does not necessarily mean a compromise with quality . . . rather, it offers an unusual opportunity for improvement.

Consider the use of Johnson LEDALOYL, a patented, self-lubricating bronze . . . the newest development in powder metallurgy. Within the past year LEDALOYL has supplemented small but important parts formerly made from zinc . . . steel . . . other metals and materials. In practically every case there was a distinct improvement in performance . . . longer life . . . economy.

An exclusive process of PRE-ALLOYING the basic materials of LEDALOYL provides uniform structure . . . uniform strength . . . dependable lubrication . . . the addition of lead as an integral part. These are but a few of the many factors that contribute to the unusual performance of LEDALOYL. Write today for complete details.

New Catalogue

Listing over 2000 sizes of Johnson LEDALOYL for which we have tool and die equipment. This includes plain, flanged and self-aligning bearings. Write for a copy.

JOHNSON BRONZE COMPANY

Sleeve BEARING HEADQUARTERS

515 SOUTH MILL STREET • NEW CASTLE. PA.

America's Machine Army

SINCE THE JAPS stabbed us in the back at Pearl Harbor, there has been a rush of young men to enlist in the Army, the Navy and the Air Corps. They want to do their part to prevent the further murder of American soldiers, sailors and civilians. They wish to avenge those who have already died. And they have a burning desire to stamp out forever the threat to our country and to our way of life.

That sort of direct action is fine and fitting. It is the kind of red-blooded, two-fisted action that one expects of Americans. But this war for freedom will not be won if enlistments begin and end with the armed services. They must be extended to all of America's manpower and machine power.

Military manpower alone cannot bring us victory. France had lots of men in her army, but they did not possess the modern weapons of warfare—up-to-date guns and tanks and airplanes in large numbers. All of us know what happened to France.

The reason that Germany has had such sweeping successes since September of 1939 is that she has had the fighting tools with which to overwhelm her ill-equipped foes. The same reason accounts for Japanese successes in the Philippines, at Hong Kong and in the Malay Peninsula.

If America is to come out on top—and no American doubts for a moment what the ultimate outcome will be—we must outproduce the Axis powers. We must intensify the Battle of Production—and do it quickly.

That means that every machine operator and every supervisor must throw everything he has into this gigantic battle. Holding back that last ounce of effort at this time will result in fewer pieces being produced, and that in turn will contribute to prolongation of the war. The more each production man puts into his job today, the quicker the disagreeable task will be ended.

When we say manpower, we also are talking about womanpower, because it too will be needed as never before. With our armed forces heading quickly toward seven to eight millions of men and with many war industries estimating that their labor requirements will be the greatest in history, we are rushing toward the day when women must be extensively employed in industry. This truly will be an "all-out" effort, because there will be a definite place for every able-bodied man and woman somewhere.

This Battle of Production also calls for full mobilization of all of America's machine power. Every existing machine tool suitable for defense work must be used. Thousands of such machines are standing idle around the country or can be spared from their present employment. They should be put into service right away to help win the war.

While remembering Pearl Harbor, let's also remember that the key to the success of our enemies to date has been their prodigious output of planes and tanks and guns and ammunition. Without such production there would be no Luftwaffe. Without such production there would be no Panzer divisions.

Our first and foremost task and our greatest hope of success rest upon becoming as quickly as possible the arsenal of democracy. Every manufacturer can help. Every manufacturer has an obligation to help. He should scour every nook and corner of his shop for idle equipment and for equipment which he can spare by putting a greater burden on other machines. He should report that equipment at once to defense authorities so that it can be put to work where it will do the most good.

Let's enlist without delay every physically fit machine tool in America's machine army in this righteous fight for freedom.

Burnham Finney

GAGING BUSINESS

Machine-tool industry hopes to double production. Individual agreements with OPM determine expansions. Freight car schedule not likely to be met. Wooden barges save steel. Ahead on tanks.

Asked to expand its output sharply, the machine-tool industry hopes in 1942 to double its 1941 production. That means that about $1,500,000,000 of machine tools will be built this year to be used in the manufacture of war goods for the United Nations. In December, machine-tool builders produced $85,-100,000 of machine tools, a rate in excess of $1,000,000,000 a year. On that basis it appears likely that the industry will be able to attain its 1942 objective, which has been revised upward substantially since the Pearl Harbor attack.

Machine Tools—The Office of Production Management is working with machine-tool builders individually to arrive at agreements of how much expansion should be undertaken. In a number of cases the OPM is asking that builders of critical tools triple their present output. It is no secret that the OPM is urging upon machine-tool companies more sub-contracting of parts, subassemblies and entire machines. Any plans for having automobile makers produce complete machine tools are not expected to get far, because the automotive industry is already well loaded with defense business. OPM is suggesting to war contractors in need of machine tools that they order the simplest types of machines to do the particular job instead of insisting upon more complicated machines which take longer to build and of which there is a shortage already. It also is suggesting that contractors use their best ingenuity to improvise ways of doing machining work with used machines or with tools in their plants now. It is estimated that there are 50,000 idle used machine tools in the United States today, most of which can be employed on war jobs. The ferreting out of these machines is one of OPM's biggest headaches. Machine-tool companies are still experiencing difficulties in keeping subcontractors who can take war work at higher prices from prime contractors operating on a cost-plus-fixed-fee basis. The policy whereby machine-tool builders can get 30 percent down in cash on war contracts is not yet working satisfactorily because of technicalities which builders are asked to meet.

Steel—It is estimated that 65 percent of steel output during December went into direct defense projects. The Victory program will take practically all the steel that this country is capable of producing, with none left over for civilian requirements. Even now a customer with a rating lower than A-10 finds it impossible to get any steel. Those users who have been accustomed to employing tungsten steel must be satisfied now with an M (for molybdenum) steel instead. Only limitation on steel production looming ahead is the lack of sufficient scrap. Perhaps enough of it will be found, however, to keep mills running 100 percent or close to it. A drive is on to expand the manufacture of steel plate for ships. Steel companies are being asked to operate plate-making facilities 168 hours a week, to plan greater use of continuous strip mills for plate production and to simplify plate orders so as to secure faster output. As a result of this speed-up process, January production should be 12 percent higher than December's volume. A further increase of 10 percent is expected in March.

Railway Equipment—Close to 9,000 freight cars were turned out during December and a slightly greater number will be produced this month. The Office of Production Management has requested that 36,000 freight cars be constructed in the months of February, March and April, but attainment of that goal within the time limit set appears improbable. Car builders are getting more steel plate from the mills than they formerly did. The manufacture of diesel-electric locomotives is proceeding at top speed.

Shipbuilding—In an effort to conserve steel, the Maritime Commission has taken bids for construction of 500 wooden barges. The non-propelled deck cargo barges are to be delivered at either New Orleans or Mobile, delivery of the first barge to be made in not more than 30 days and the last in not more than 110 days from the date of the contract. The barges are to be used for inland waterways, possibly in other countries. Price range is from $3,000 to $12,000 a barge.

Aircraft—Automobile companies are getting much nearer the time when they will contribute substantially to aircraft engine production. Ford is now turning out over 10 Pratt & Whitney engines a day and Packard is close to mass manufacture of the Rolls-Royce engine. Allison Division of General Motors is assembling over 1,000 engines a month. The output of planes is mounting.

Munitions—Appointment of William S. Knudsen as a lieutenant general is expected to expedite the manufacture of aircraft and of munitions for the War Department. He will have full charge of handling the procurement of materials. One of the jobs which must be done is to give help to those suppliers who are having trouble in setting up production operations so as to meet promised delivery dates. Output of many items is far ahead of schedule.

From Defense to War—When the U. S. switched from defense to war last month, expenditures for war materials rose sharply from $1,532,000,000 in November to $1,997,000,000. But sharp, immense rises are to come. The President's huge war program calls for monthly expenditures of $5,000,-000,000. By June that goal will be almost attained.

METAL SUPPLIES MAY RESTRICT ARMS OUTPUT

SAVES WAR MATERIALS

NEW YORK—Using replacement materials, the Western Electric Co. now is saving strategic materials at the following yearly rates: aluminum, 1,763,000 lb.; zinc, 4,305,600 lb.; nickel, 244,200 lb.; magnesium, 9,700 lb., crude rubber, 787,800 lb.; phenol varnish, 177,100 lb.; and silk, 460,020 lb. The company has prepared a public exhibit showing the use of alternate materials in many equipment items.

KNUDSEN FRONT FOR NELSON?

WASHINGTON—Appointment of William S. Knudsen as a Lieutenant General in the Army is taken to mean different things by different observers. Roosevelt called Knudsen the World's great production man and indicated he would serve mostly in the field to expedite production. Some war executives fear that Roosevelt again has divided delegated authority, and that Knudsen will stand in the way of Nelson's "final" decisions.

Others believe that Knudsen was commissioned as a front man for Nelson, whose authority includes power to make technological decisions on Army and Navy munitions. Probably he would not feel comfortable doing so, not being a technical man. Knudsen is qualified to do it for him.

Nelson's No. 1 problem appears to be materials. Requirements are difficult to predict, may be met by complete civilian curtailment

WASHINGTON—Even Donald Nelson, backed by sixty billion dollars, cannot turn gold into tin.

Number 1 of all problems facing President Roosevelt's new War Production Board is the apparent shortage of materials. Number 2 is plant capacity. But fear of scraping bottom of the copper barrel, the steel barrel, lead, zinc, tin, magnesium, is Nelson's bogey.

Just how short the metals may run not even the inner sanctum of statisticians know.

Variables Block Estimates

They know their figures on the metal supply, but they don't know the requirements. Three variables in the requirement equation constantly lead them into delusions:

First, there is a new arms objective every change of the moon. - It has been doubled again and again. The President's staggering demand for tanks, planes, guns and ships knocked down the whole Babel tower of estimates, and now they're starting at the bottom again.

Second, pressure due to shortage itself creates a change, in that it forces substitutions of materials, thus easing up on one item, crowding the supply of another.

Third, prospective supplies change. You can't get real action of a job until the boom falls. Everybody knew it might fall on tin and rubber in the East, but the drastic, the effective remedies were not applied till they had to be.

Many observers do not believe the President's objectives can be met, because of materials shortages. Privately they sink the merchant ship schedule and ground the airplane program, on a luncheon tablecloth in five minutes.

But the optimists can figure, too. Consider copper. It looked bad before FDR dropped his war elephant in the nation's back yard. The pessimists say that if war production took **all** of the copper, leaving none for civilian use, it wouldn't meet the war need half way. They forget that the President did not ask for shell, which consume the bulk of defense copper.

Sufficient Copper Available

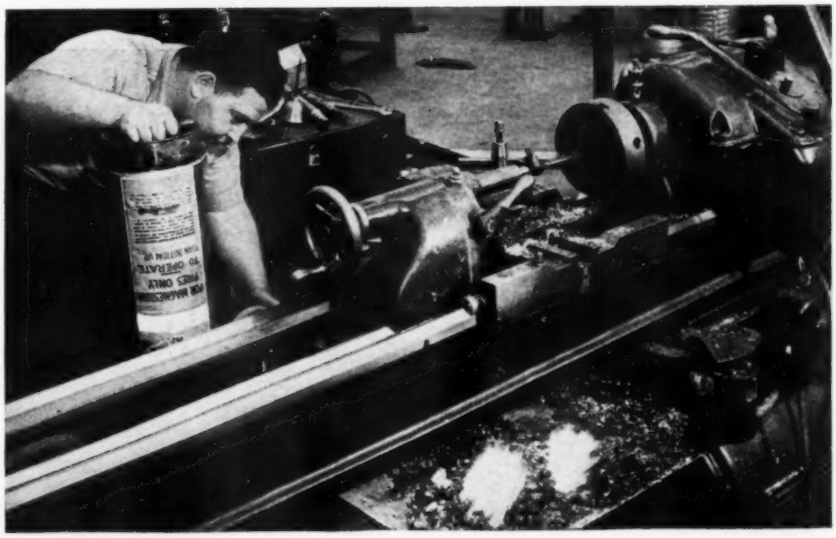
Copper is a must for some bearings, most wiring, and most oil lines in ships, tanks, planes. The quantities are small and on that basis, there is enough copper for war.

Aluminum looks pretty tough, too. But it's not impossible. The President called for 60,000 planes this year. That number, divided between trainers, and light and heavy combat, would take something like 844,000,000 pounds of aluminum. We are producing at the rate of about 720,000,000 pounds, and by the end of the year we will reach a rate of 1,600,000,000 pounds. It also would be possible to take aluminum away from nearly all munitions except airplanes. So there seems to be a safe margin.

OPM Busy Calculating

The Office of Production Management is trying to figure itself out of the whole in all metals, of course. You may never know the answers, especially if they're bad. But we will produce about 160,000,000 pounds of magnesium this year; nickel, 18,000,000 pounds a month; zinc, 978,000 tons; lead, 900,000 tons; and steel ingots, about 83,000,000 tons, with war consumption climbing from 60 percent at present to 80 percent by the year end. The visible supply of tin is less than 125,000 tons, and it will have to be stretched indefinitely.

EXTINGUISHER PUTS OUT MAGNESIUM BLAZES



BURBANK—A combination of several viscous liquids with carbon dioxide, invented by Fireman Michael Farris, Vega Aircraft Corp., will instantly extinguish magnesium fires. It has been found particularly useful in putting out magnesium fires in lathes and milling machines in the Vega machine shop. The mixture is applied from a regulation fire extinguisher and no special training is necessary. Lathe operator, above, puts out blaze on his machine. This quick method of snuffing out magnesium fires undoubtedly will save much valuable material and equipment, and it is satisfactory for combating incendiary bombs which usually are made of magnesium.

OPM Revises Preference List, Machine Tool Priority Order

WASHINGTON—After trying since last October to get the various services of the Army and Navy to agree among themselves on the relative importance of the different things they buy, Office of Production Management's priorities division has finally managed to

issue a revised version of the Master Numerical Preference List. This is a confidential document listing armament makers numerically in order of importance and is used by machine tool builders to tell them which of two orders to fill first when both have the same priority rating.

While issuing the new list, OPM also revised the machine tool priority order. The revised version, E-1-a, differs from the previous document, Supplement No. 1 to order E-1, in that gages and chucks are now subject to the same delivery procedure as machine tools. Chucks are classed in Group I as noncritical and gages fall in Group II among the critical tools. Other changes in the order are purely verbal.

The new order became effective Jan. 15. The numerical list becomes effective Feb. 14 as to Group I tools and will be instituted March 16 as to those in Group II.

Use of 'PD' Ratings Simplified; Orders Extended to Suppliers

WASHINGTON—Use of the "PD" ratings employed to get priority on individual orders is greatly simplified by the new set-up established under Priorities Regulation No. 3. These ratings now become nearly as simple to use as the blanket P orders granted to war-important industries.

There are now only two forms—PD-1A and PD-3A. The second of these is issued by procurement officers on direct government contracts. Procedure in issuing it is the same as formerly used on PD-3 ratings except that the Priorities Critical List is eliminated. Previously, procurement officers could only issue ratings on orders for items on the list; now this restriction is removed. Everything is critical these days.

Application Becomes Rating

The PD-1A rating is attached to orders not directly placed by the government and is issued by the Priorities Division of OPM. Application for a rating is made on this form, and, if it is approved, the endorsed application becomes the rating. Big innovation is that both PD-1A and PD-3A may be extended to suppliers and sub-suppliers indefinitely so long as the material on which the rating is used will be physically incorporated in goods to be delivered to the original holder of the priority certificate.

In extending a PD rating, it is no longer necessary to obtain the countersignature of a procurement officer. The producer extending the rating need only attach to his purchase order a certification in prescribed form signed by an official of the company.

Exception to the rule about physical incorporation in the finished product of supplies received by extension of a PD rating is that suppliers may use the rating to replace in their inventories goods used to fill the rated order. Manufacturers or processors using this privilege must replenish the inventory while the manufacturing process is still underway.

Wholesalers and distributors, however, who do not process the material going through their hands may deliver goods out of stock on a rated order and then wait as long as three months before they extend the rating to replenish their inventory. This enables them to accumulate enough such orders so that they can do their buying in commercial quantities.

GE USES LONG IDLE PLANT

FITCHBURG—A plant idle for eleven years has been acquired by the General Electric Company for the production of war materials. Built twenty-five years ago for the manufacture and repair of railroad equipment and heavy machine tools, the factory is known as the Putnam Works of Manning, Maxwell and Moore, Inc. A full force will take over the plant immediately, and by May it will employ a thousand mechanics.

AUSTRALIA NAMES SUPPLY AGENT

NEW YORK—A War Supplies Procurement Commission with headquarters in Washington has been created by the Australian government. Procurement work being undertaken by the Australian Legation, the Trade Commissioner's Office, the Australian Division of the British Purchasing Commission and various private agencies will be merged under L. R. MacGregor.

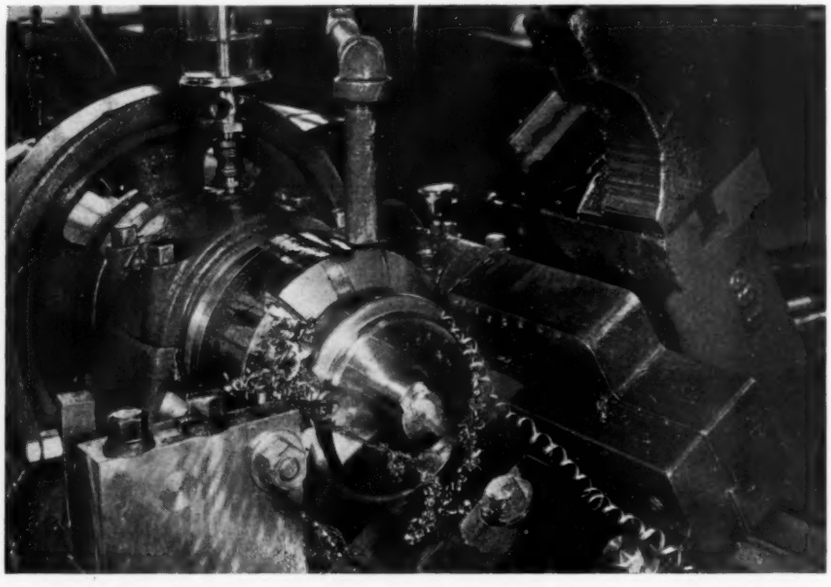
Auto Production Nears End; Study Repair Parts Need

WASHINGTON — Passenger car production is finished at the end of this month, with minor and, as we go to press, unlikely exceptions. January output of 204,848 cars will be added to some 450,000 cars in dealers hands to form a pool of cars to be rationed out over the coming months for essential civilian needs. When those are exhausted, there is a vast reservoir of used cars. These might have to be requisitioned but probably inability to get tires will force enough on the market to meet needs. Eventually, it may be necessary to resume small-scale manufacture of cars, but this looks to be far, far in the future.

Bus Output Increases

Still a question mark is the handling of replacement parts. Unquestionably these will be manufactured to keep existing cars on the road. But by whom and in what volume is unsettled. Now underway are studies of the long-range needs for parts—particularly as to what reduction in demand can be expected to result from tire restrictions.

Production of trucks over 4½ tons will be permitted in February at a rate —55,435 units—15 percent greater than in 1941. Bus production is stepped up even more, to 1,065 compared with 450 a year ago. Assumption is that manufacture of these vehicles will continue. However Joseph Eastman, new coordinator of defense transportation, who ought to know, says he's afraid OPM will halt truck manufacture after March. In any case a truck rationing scheme is now being worked out.



Bearing Conversion—Confronted with the need for greater production 3¼ to 10 in. outside Diameter bearings for tanks and trucks, the Timken Bearing Co. converted 40 small automatics. The old feeding and chucking mechanisms were replaced with adjustable air-operated chucks and taper devices as above

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Seeking War Work? File Plant Data With Your DCD Office, Now!

NEW YORK—Manufacturers desiring war contracts or subcontracts are advised by the Office of Production Management to file immediately with the Field Office of the Division of Contract Distribution in their district. For your convenience the complete list of 105 offices is printed on this and the following pages. Information that should be submitted to the DCD includes machines in the plant or shop, their age and condition; type of work previously performed; working forces available; financial condition of firm; and type of work you think you can perform.

On the basis of material submitted, DCD engineers will determine the kind of war work for which you are suited, the DCD will try to show you how and where to get a contract or subcontract.

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Labor Loses Conversion Fight; Auto Industry Gets Chance to Produce

WASHINGTON—The revolution never came off. The auto industry is to build armament on substantially the same commercial basis that it built cars. This was the net outcome of the great meeting early this month of management and labor representatives of the industry. The big issue was whether the industry, changing its products from cars to tanks, planes and guns, should also change its way of doing business to those of the Reuther plan.

Labor representatives at the meeting proposed (1) that the industry be pooled into one vast factory with compulsory allocation of work and interchange of facilities, and (2) that control be vested in a joint management-labor committee. On this, they had the support of Sidney Hillman and at least a benevolent wink from Under-Secretary of War Patterson.

Contracts-as-Usual Prevail

On both issues the labor people were —at least temporarily—thoroughly defeated. Auto management, supported by William Knudsen, were able to see to it that contracts-as-usual will prevail. Arms contracts are already being placed with the major producers. What interchange of work there is will be accomplished voluntarily by sub-contracting.

The question went beyond the auto industry. Autos were the guinea pig for a host of others. A pooling scheme is involved in plans being worked out for switching part of the facilities of the construction equipment industry to tank manufacture.

Question Permanency

How permanent the auto arrangement will prove is another question. It was Knudsen's work, and the elevation of Donald Nelson to production czar practically removes Knudsen from any decisive voice in policy setting. It remains to be seen whether Nelson will push for a tighter organization.

If he does, the instrument is ready in the seven-man, labor-management group headed by Cyrus Ching. This committee emerged from the auto meeting as an advisory body to OPM, charged with suggesting means for the rapid conversion of the industry to munitions.

Pooling by Voluntary Action

The same job, on a technical rather than a policy level, is being attacked by the Automotive Council for War Production set up in Detroit by the industry itself. Common to both groups is the fact that any recommendations on pooling of facilities are carried out by voluntary action of the companies concerned.

By blocking any major change in the structure of the industry, auto management has put itself on the spot. Unless it starts delivering goods from its converted facilities faster than anyone thinks it can, the Reuther plan or something like it will get another whirl. Kicking around Washington is the rumor of a two-month deadline. It's only a rumor. But it's an indicator of the prevailing attitude.

INSIDE DETROIT

Fearing socialization, auto industry will go all out to achieve armament production goal. Substitution of Reuther plan board for direct management opposed. General Motors gets immense orders

BY RUPERT LEGRAND, DETROIT EDITOR

DETROIT—The automobile industry is appalled by the narrow margin by which the Reuther plan was rejected during the government-management-labor conference Jan. 5 to 7 in Washington.

In fact, it is still an open question whether management must relinquish control of defense production in its plants in favor of an experiment in what it calls socialization of the industry. Office of Production Management demands a 100 percent boost in armament deliveries in 1942. People do not understand the immensity of the task—a four-fold increase in production rate of mechanical goods. During the next six months, when much retooling will be going forward, there is a definite danger that the Reuther plan will be adopted.

Union Objectives Shifted

In a sense, the automobile industry is responsible for allowing itself to be dragged to the crossroads. The original Reuther plan, proposed 13 months ago, suggested that *excess capacity* then existing in auto plants be converted to war production even though contracts had not been offered. Since then, publicized objectives have cannily shifted with events, but union leaders have been consistently vague as to how they specifically propose to do a quicker and better job of defense retooling.

Accustomed to discuss concrete proposals, management has refused to debate a nebulous program in the newspapers. Experienced observers believe that a smarter publicity job could have been done by the industry.

Industry Position Undefended

During that period, however, the industry's position went practically undefended, while clever union publicity molded public opinion. Commentators, who apparently did not understand the real objectives and disadvantages of the Reuther plan, wrote millions of words on the subject. One-sided publicity has built up a tremendous public interest in the question, and at long last aggressive automotive managements will frankly speak their views.

Boiled to essentials, the Reuther plan demands creation of a super planning board equally composed of management, labor and government members, on the premise that a disinterested board can achieve a faster flow of armament and a quicker retooling job than if the responsibility is left in the hands of organizations developed over the past 30 years. In other words, what amounts to socialization of the industry apparently is sought. Control of industry through cooperation of the government members on the super planning board, is considered labor's real objective. If necessary, this board would set up its own staff of managerial, technical and production talent to operate the industry's facilities as one huge war unit.

Reuther Considers Post War Plans

Walter Reuther frankly told the Detroit press that a voice in management must be achieved during the war effort, if the union is to have a part (perhaps control) in deciding questions of post-war economy. The long-range goal is important in Mr. Reuther's estimation.

The prime disadvantage of the super planning board is that it substitutes a committee system for direct lines of managerial authority. The Army and OPM did not accept the program offered by the Automotive Committee for Air Defense because it did not like the committee system and preferred to place full responsibility for major armament contracts in the hands of companies with the resources to get the job done in the shortest time.

AMA Announces Program

Nothing has been said by the union on subjects such as: (1) an estimate of the time required to perfect a super planning board's staff, nor (2) the probable loss in defense production while a revolution is effected in the usual methods of operation.

Much will be heard from various auto companies on what their defense plans and loads are, consistent with regulations governing wartime secrecy. The Automotive Council for War Production, set up by the Automobile Manufacturers Association, announced a three-point program:

1. Creation of a Used Machinery Listing Service, to provide detailed data on all machine tools not earmarked for military production by automotive owners. All automotive concerns and industry generally will receive these data. This step presages a widespread dispersion of equipment regardless of future consequences.

2. Automotive tool shops, whenever not needed on the owner's war work, are made available to produce tools for military production by other companies.

Will Deal With DCD

3. Each auto firm will appoint a representative to deal with the local offices of the OPM Division of Contract Distribution.

The industry will develop a standardized system of identification of machine tools by type, age, model and condition. Lists will be kept on file in Detroit and supplied to OPM and military services.

General Motors stresses the problems confronting the auto industry since Pearl Harbor, by revealing the tremendous new war orders received in the first ten days of January, and the

BOMBER MOTORS UNDER WAY

DETROIT — Mass production of 1,200 hp., fifteen cylinder, air-cooled Buick-Pratt & Whitney engines for the Army's long range bombers was started last week by the Buick Motor Division of General Motors Corp. First motor was completed 243 days from the time blueprints were approved for a large plant in Melrose Park, Ill. The project eventually will employ 30,000 workers in Flint and Melrose Park.

Contracts, Orders, Deliveries and Commitments for War Materials by General Motors Corporation

Types of War Material	Cumulative value as of June 30, 1941	Cumulative value as of Dec. 31, 1941	New contracts, orders, letters of intent and commitments, Jan. 1–10, 1942	Additional in process of negotiation on Jan. 10, 1942
AIRCRAFT, parts	$535,099,691	$827,024,793	$135,750,000	$816,100,000
TANKS, power units, track sets, parts	2,312,060	69,244,496	522,445,000	77,000,000
GUNS, gun mounts, controls, machine guns, rifles	169,360,625	271,846,867	87,730,000	405,400,000
MARINE diesel engines, parts	154,650,335	217,834,375	0	49,300,000
AMMUNITION, shell, shot, cartridge cases, fuses	25,594,641	78,665,996	1,192,000	20,630,000
TRUCKS, transmissions, cars parts	58,180,603	136,734,185	21,165,000	0
ELECTRICAL equipment, parts	13,449,123	5,574,903	1,048,000	0
OTHER materials	1,530,661	12,905,604	0	0
TOTAL	$960,177,739	$1,619,831,219	$769,330,000	$1,368,430,000
DELIVERIES	164,960,421	409,968,046	.....	.....
UNFILLED ORDERS	795,217,318	1,209,863,173	.....	.....

pledge that it has made in respect to 1942 deliveries of armament. As of Dec. 31, cumulative value of contracts and orders placed with G.M. totalled $1,619,831,219, of which $409,968,046 had been delivered.

Contract Flood Coming

In the first ten days of January contracts worth $769,330,000 were received, practically a 30-fold increase. Additional orders pending total $1,368,430,000, not including the corporation's share of the several hundred items tossed out to the auto industry during the Washington conference.

At the present time General Motors is producing munitions at the rate of $700,000,000 per year. But, it is pledged to produce $2,000,000,000 in 1942, a sum equivalent to its peak annual production of mechanical goods (1941).

Canadian Steel Output Rises; Want Lower Duties in U. S.

OTTAWA—With about 425,000 tons extra capacity coming in in May, Canada this year will be producing about 3,000,000 tons of steel. Production in the pre-war period was 1,200,000 tons, with a potential of 1,700,000. Increases by Dominion Steel & Coal Corp. at Sydney and by Steel Co. of Canada at Hamilton bring production at the beginning of the year to 2,400,000 tons.

Canada's requirements of U.S. steel are placed at 1,800,000 tons. Ottawa officials think they will do well to get 1,400,000.

Block Non-Essential Use

No steel will be allocated to non-essential production in Canada this year. Automobile production will cease entirely March 31. Manufacturers of washing machines, electric stoves, refrigerators and radios have a stop order for Feb. 28.

To implement the Roosevelt-King declaration for pooling of war production on this continent Canadian officials consider that amendment of the Canada-United States trade treaty to permit lowering or elimination of duties is necessary. Canada at present is admitting free of duty war equipment consigned to Britain's account, is collecting duty on war goods charged to Ottawa's account. Washington is levying full toll on Canadian zinc, copper, brass and other materials going into U.S. war production.

War Production Increases

It is expected here that Ford of Canada and General Motors of Canada will extend production of mechanical transport—including universal carriers—to United States order. These companies have been among the most successful of Canadian industries in war production. On March 31 their assembly lines will swing completely into war production. The Canadian Chrysler plant at Windsor will increase its output of light tanks. John Inglis Co. and Sorel Industries are expected to make gun barrels to United States order. Canada's requirements in heavy tanks probably will be diverted to the United States.

WAR ORDERS IN BRIEF

ALUMINUM SCRAP—Supplementary materials Order M-1-d makes mandatory the segregation of aluminum scrap by alloy content and form within each plant.

COPPER SCRAP—A revision of materials Order M-9-b forbids deliveries of copper or brass scrap except to scrap dealers, or in case of brass mill scrap to a brass mill.

LEAD—Conservation Order M-38-c prohibits use of lead in many civilian items after April 1, and restricts use until then to 50 percent of that used in either of the past two quarters of 1941.

LIFT TRUCKS—Preference rating Order P-40 granting an A-1-g rating for materials used in industrial lift trucks has been extended to March 10.

OFFICE FURNITURE—Limitation Order L-13 curtailing use of steel in metal office furniture has been extended until March 31.

STEEL DRUMS—An amendment to preference rating Order M-45 permits use of hot rolled sheet steel of any gage for steel drums for overseas shipments.

TIN—An amendment to preference rating Order M-43 cuts amount of tin which can be delivered to regular customers without specific authorization to three tons. No customer can receive more than five tons from all suppliers and must file a certificate of compliance.

TIN, LEAD SCRAP—Preference rating Order M-72 placed tin and lead scrap under priorities control and requires monthly reports by dealers and consumers.

VACUUM CLEANERS—Supplementary limitation Order L-7-a cuts production of domestic vacuum cleaners for the first quarter of 1942 from 25 to 40 percent depending on manufacturers previous volume.

VENDING MACHINES—Limitation Order L-27 curtails use of iron and steel in vending machines 50 percent in February. After Feb. 1, use of copper, lead, tin, stainless steel, nickel and chromium is prohibited except for electrical conduction and refrigeration.

Way Left Open to Closed Shop, Board Gets Test at Kearny

WASHINGTON—Labor had its way in the President's labor-industry conference last month—to the extent, at least, that the way was left open to extension of the closed shop. But in forming the new War Labor Board, the President followed the recommendations of management. Labor didn't want William H. Davis as chairman, having lost faith in him over the coal strike decision.

The President, however, set up a twelve man board—three representatives each of labor, management, and the public—with Davis as chairman and George W. Taylor, professor of economics at the University of Pennsylvania, as vice chairman. There are three major differences between WLB and the National Defense Mediation Board. The War Labor Board can take jurisdiction over cases on its own authority.

The President empowered WLB to settle cases not only by mediation and voluntary arbitration but also by "arbitration under rules established by the board." This last sounds like compulsory arbitration. More of a question mark is the third difference. The WLB is backed by a declaration on the part of presumably responsible representatives of industry and labor that all cases will be referred to the board without stoppage of production. This could mean everything or nothing.

A pretty conclusive test of how much it means is likely to come very quickly. The tough Federal Shipbuilding & Drydock case at Kearny, N. J., is on its way to the board. It will be remembered, a dispute over inclusion of a maintenance of membership clause in a union contract was referred to the old NDMB, which recommended that "m. of m." be granted. The company refused, and the Navy seized the shipyard. Early this month, the Navy turned the yard back to private management with the dispute still unsettled. Now, the new board must decide the issue. In such an embittered case a decision either way will put a mighty severe strain on the determination of the losing side to abide by the no-stoppage agreement.

23,000,000 WAR WORKERS

WASHINGTON—Office of Production Management National Labor Supply Policy Board plans to increase the present 5,000,000 workers engaged in war industries to 15,000,000 by the end of 1942, and to 23,000,000 by the end of 1944.

WARTIME WASHINGTON

FDR gives Nelson full power to direct war production. Even Army and Navy must accept his orders. Further power may come on United Nations Council. Time vital factor in armament goals

BY BLAINE STUBBLEFIELD

WASHINGTON — President Roosevelt this month created in Donald Nelson what amounts to an associate president, as far as war production is concerned. As production boss, Nelson can determine the policies of every Federal agency concerned with war procurement and production. He can tell the Army and Navy where, how and on what terms to place contracts. He can tell them to change or to standardize the design of their armament in the interest of speedier production.

Nelson controls the conversion of civil industries and expansion of plants—he can order the requisitioning of production facilities. He can tell Jessie Jones what to do about the financing of new plant.

And they all have to do what he tells them.

Production Board Only Advisory

The new set-up is 100 percent one-man control. The new War Production Board, made up of the membership of the now abolished Supply, Priorities and Allocation Board, is purely advisory to Nelson. He can act without taking any votes. The Office of Production Management is to function under Nelson supervision, and he can make any organizational changes in it that he thinks necessary.

Even the high and mighty Army-Navy Munitions Board will report to the President through Nelson.

No Explicit Labor Control

Only gap in the sweeping assignment made by the President's executive order is labor, over which Nelson is given no explicit control. As we go to press, a scheme to centralize all agencies dealing with labor—the War Labor Board, U. S. Employment Service, OPM's Labor Division and perhaps the National Labor Relations Board—in the Department of Labor is being worked on. The plan, said to have both AFL and CIO support, would involve naming a new Secretary of Labor, or giving Miss Perkins a strong assistant. Hillman possibly might get such a post.

Broad as are the powers granted to Nelson, plans are under discussion which would make them even broader —would give him control over the economy of two thirds of the world.

May Head United Nations' Supply

An Inter-Allied Supply Council has been considered for some time. International control of the 26 United Nations' materials is a logical expectation, because such widely scattered resources are even harder to put to efficient use than our domestic resources. Presumably, since the United States is the main war supplier, Nelson would head up the World War supply headquarters.

Task Staggers Imagination

Huge as are the production goals set up by the President in his "War Program" message to Congress, their sheer enormity is not evident until they are reduced to terms of monthly output. And this is because the vital factor is time. There is no real limit to the amount of armament we can build given the time, but to accomplish the President's program in this calendar year is a task that staggers the imagination. The President demanded:

(1) 60,000 planes in 1942. AMERICAN MACHINIST has pointed out before that scheduled airplane output at the end of 1941 was 2,500 a month. Production figures are now secret, but it is fair to assume that the schedule was met. Intention before FDR raised the sights was to reach a rate of 4,000 in the first half of 1943.

Thus we enter 1942 producing planes at a rate of 2,500 a month. To meet the President's figure, this rate must rise to 5,000 by July and by December to a stupendous 7,500.

The 1943 production rates are even greater—a total of 125,000 planes, calling for a monthly output by July '43 of 10,500 and by December of 13,500. But to meet these 1943 schedules, time is available—time for planning, for building plants, for re-tooling converted plants.

Will Almost Double Tank Schedules

(2) 45,000 tanks in 1942. At the beginning of the year tank production is probably under 1,000 a month. Late in 1941 tank production schedules were doubled and tripled (see AM, Vol. 85), were believed then to call for an output of some 2,000 in July, perhaps 3,500 by the year end. The President's program requires that by July we turn out 3,700 tanks a month, and 6,500 tanks by December. Tough as this is, it isn't as tough as the airplane schedule. It means, essentially, that plant facilities now scheduled to hit full operation late in the year must be brought in in about half the time; new production sources must be developed. In 1943, production would flatten off at the December '42 rate for a total output of 75,000 tanks.

(3) 20,000 anti-aircraft guns in 1942. Production of anti-aircraft in the various calibers is probably not over 500 guns a month. The new schedule will require an output of some 1,700 a month by July, 2,800 by the year end.

Head Production Man—Donald Nelson, chairman of the War Production Board, is second in authority only to President Roosevelt, whose power, now world-wide, far exceeds that of any person in history. Nelson is a big, country-banker-looking man, who through 21 years of Sears Roebuck merchandising knows the industry of America. The first time people in Washington heard about him was two years ago when he came here as chairman of a wage-hour committee of the textile industry

Ship Increase Comparatively Easy

(4) 8,000,000 tons of shipping. As pointed out on page 350k, this one is comparatively easy, involves only a little more than a 50 percent increase in present schedules.

Perhaps the best overall indicator of production effort is war spending. At the end of 1941, we were spending money for war at a rate of just under $2,000,000,000 a month. The new program will require expenditure of $3,200,000,000 in June, $4,600,000,000 in December, 1942.

ARMY MOVES 240 mm. HOWITZER

WASHINGTON—A 240 mm. howitzer is being moved under military guard from South Milwaukee, Wis., to the Aberdeen Proving Ground, Md., where it will be tested, the War Department announced. The gun will be moved via Chicago, Cleveland, Buffalo, Albany, New York and Philadelphia.

ARMY FINDS SUBSTITUTES

WASHINGTON—In a wholesale campaign to conserve materials that are in the critical and strategic classes, the Army Quartermaster Corps has found satisfactory substitutes for bronze finishes in 174 products used by he Army, and have eliminated the use of: bronze in 116 items, zinc in 93, nickel in 78, copper in 66, bronze in 68 and aluminum in 58. Substitutes have also been found for chromium, cadmium, steel, rubber, magnesium and lead.

Substitutes authorized for bronze include plate glass, soft annealed steel, malleable iron, galvanized iron, cast iron, ceramic ware, cast bronze and steel. For copper, sheet lead, steel, galvanized iron, black iron, and bronze are now being specified. Painting surfaces conserves zinc formerly used in galvanizing. Paint also replaces many uses of nickel plating. Steel, cast iron and malleable iron are satisfactory in place of aluminum for many applications.

OPA PUTS PRICE ROOF ON TOOLS

WASHINGTON—About 120 manufacturers of portable power driven tools have been asked by Office of Price Administration not to raise their net sales prices above those prevailing on October 1, 1941. As this was written, the portable tool group had been asked to discuss the matter at a meeting in Washington January 17. Administrator Leon Henderson pointed out that this class of tools plays an important part in the war production program.

SAE Promises Cooperation in Converting Auto Plants to War Production; Alloys Short

DETROIT—Full cooperation by members of the Society of Automotive Engineers toward "production engineering" the automotive industry into an enormous arsenal, was promised Alvan Macauley, chairman of the Automotive Council for War Production. SAE members have been active since World War I on war-equipment problems for military agencies.

Automotive engineers attending the record-breaking annual meeting of the Society here last week believe the industry has already accomplished much in retooling for arms production. Office of Production Management officials told the industry at Washington that there was something like $34,000,000,000 in contracts "to be awarded", indicating that on many items the motor builders could bid.

Want Details Immediately

Despite huge but untabulated commitments already received in early January, Detroit automotive engineers ask that further blueprints, specifications and orders be promptly forthcoming so that the retooling task can be handled speedily in an organized engineering manner.

E. S. Chapman, Chief, Artillery and Ammunition Section, OPM, urged industry to take a more aggresive attitude in seeking munitions contracts, because Washington procurement officers do not have the time to seek bidders.

Commissioner John O. Huse, Bureau of Ships, revealed his mission in Detroit to place $200,000,000 in diesel engine and other ship parts. His list was snapped up in one day, so he will return this week with a larger list.

Believe Copper Controls Output

Herbert Hughes of the Automobile Manufacturers Association said that many persons at Washington consider copper to be the controlling metal in the armament program. Military needs for aluminum may in time absorb even low-grade secondary aluminum such as obtained from old pistons. Repair parts of steel seem abundant because a substantial portion of steel ingot production is available for civilian use, but in the field of alloy steels, military requirements are expected to absorb the entire output.

A. W. Herrington, left, president, Marmon-Herrington Co., and new president of the Society of Automotive Engineers, receives the best wishes of A. T. Colwell, retiring

Carbon Steel Should Be Used

"Where will we get alloy steels", asked E. C. Smith of Republic Steel. Two facts stand out sharply: (1) the limit of production of alloy steels depends upon raw materials available . . . by and large industry can consume more alloy steel than produced, and (2) usual habits of specifying customary compositions are not feasible. Mr. Smith urged wider application of the Jominy hardenability test and use of steels containing 0.60 nickel, 0.50 chromium, 0.20 molybdenum and 0.25 copper.

These steels, with vanadium, or the Grainal family of hardening alloys, are completely useful in all places where the usual structural alloy steel is required. Alloy is bought for its hardening power, but plain carbon steel should be used where it is satisfactory, the speaker asserted.

Government Best Source

Application of production methods with which he is familiar to aircraft manufacture should be with-held by the automotive engineer until he is thoroughly familiar with the different engineering methods and materials of the aviation industry. John C. Widman, of Murray Corp. of America, in advocating this approach, said that government regulations and specifications concerning aircraft form the best source of extensive information in compact form.

Navy "E" for B & S—Rhode Island Governor J. H. McGrath congratulates the Brown & Sharpe Mfg. Co. at the presentation of the Navy "E" pennant for excellence in production on Navy contracts

WOMEN WORK ON WARPLANES

COLUMBUS—Women are taking places beside men in the fabrication, heat-treatment and cover departments at the Curtiss-Wright warplane plant here. Twenty girls went to work recently, and thirty others are in training. They are the vanguard of several hundred women to be trained to replace men drafted by the Army and to free skilled men required in other operations.

New Ship Program Requires Much Additional Manpower

WASHINGTON—Of all the war production objectives called for by the President in his $60,000,000,000 program, presented in his "state of the nation" address to Congress, the 18,000,000-ton merchant ship schedule will be accomplished with the least difficulty.

The tonnage program laid out before Pearl Harbor was 1,100,000 tons in 1941; 5,000,000 tons in 1942, and 6,000,000 tons in 1943, or a total of 12,000,000 tons by the end of 1943. The President called for completion of 8,000,000 tons in 1942 and 10,000,000 more in 1943; these with 1941 make a total of 19,100,000 tons. Thus the 1942-43 program is half again as big as it was before.

Will Use More Men

But this increase will not require a 50 percent expansion of yards and ways by any means. In fact, the Commission tells AMERICAN MACHINIST that facilities expansion, now being figured out, will be quite small. The extra 7,000,000 tons will be built, in large part, simply by using more manpower.

In early 1941, the merchant ship construction work week was five days at eight hours. On May 1, the Commission ordered the week up to six days, 48 hours. Then came two shifts, boosting the facilities week to 96 hours.

Industry on Seven-Day Week

Now, the commission is putting the industry on a seven day week of three shifts, putting facilities to work on a 168-hour week.

The result is that a given way, producing two ships, will produce three ships in the same period. And three instead of two gives you 18,000,000 tons instead of 12,000,000.

It sounds easy on paper, but it's not, and the Maritime Commission knows it. Much more shop capacity will be needed. In addition, the industry needs more men. Normal employment is 100,000. The total now is 500,000. Later this year it will go up to 800,000 men. The Commission is providing for this increase by pushing a ship worker training program.

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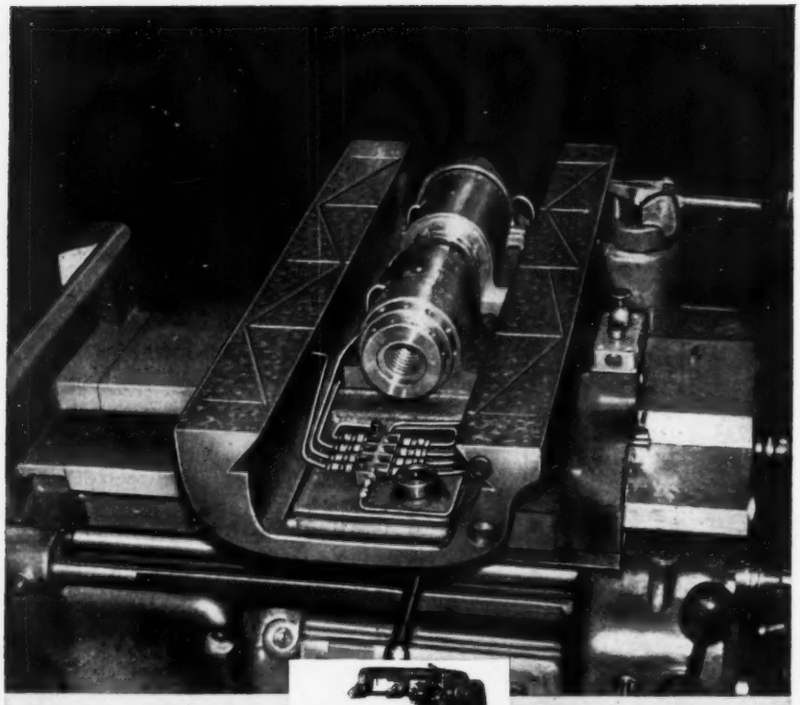

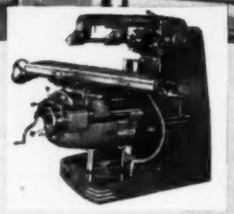

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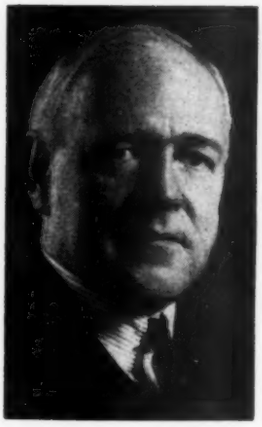
GM Appoints Brown Chairman Of War Emergency Committee



DONALDSON BROWN

NEW YORK—A War Emergency Committee to increase General Motors Corporation's contribution to the war effort through further stimulation of war materials production has been created by the company's board of directors.

The new committee supersedes the Defense Material Relationships Committee set up in June 1940.

Donaldson Brown, vice chairman of the board and vice president, will be chairman of the group comprising seven leading executives of the company. Other members of the new unit, which will also be responsible for all activity connected with the war emergency, are: Alfred P. Sloan, Jr., chairman of the corporation; Charles E. Wilson, president; John Thomas Smith, vice president and general counsel; and Albert Bradley, Frederic G. Donner and O. E. Hunt, vice president.

The board also elected the following vice presidents: George W. Codrington, general manager, Cleveland Diesel Engine Division; Nicholas Dreystadt, general manager, Cadillac Motor Car Division; H. L. Hamilton, head, Electro-Motive Division; H. J. Klingler, general manager, Pontiac Motor Division; and S. E. Skinner, general manager, Oldsmobile Division. Also elected vice president and a member of the Administration Committee was Harry W. Anderson, head of the personnel staff.

NAMES in the NEWS

Frank H. Boyd, for 30 years divisional manager, Cleveland territory, American Seating Co. is sales manager, S. G. Frantz Co., Inc.

Dwight A. Bessmer has been appointed assistant director of purchases, Timken Roller Bearing Co. F. H. Lindus, former Los Angeles branch

manager of the Service Division, has been transferred to sales promotion work at Canton, Ohio.

Bert M. Brock has been appointed manager, Industrial Relations, John A. Roebling's Sons Co. For the past year

BERT M. BROCK

Mr. Brock was director of industrial relations, Pittsburgh district, Carnegie-Illinois Steel Corp.

W. C. Buchanan was elected president, Allis-Chalmers Mfg. Co., to succeed Max W. Babb who becomes chairman, board of directors. Mr. Buchanan will continue as president of Globe Steel Tubes Co. He has been connected in the past with Keystone Steel & Wire Co., Trumble Steel, Bethlehem Steel Co., American Tube & Stamping Co., and United States Steel Corp. Mr. Babb, who holds the position formerly occupied by the late General Otto H. Falk, had been president to the company since 1932 and was vice president from 1913 to 1932.

J. Roger Davis, is supervisor of branches, Chicago Pneumatic Tool Co. This position was recently created to assist sales activities in district and sub-district offices.

Ralph H. Deihl becomes advertising manager, The Falk Corp.

Benjamin F. Ellis partner with Edmund L. Sanderson in Waltham Machine Works has retired. Their partnership was formed in 1898 to build machines and tools.

A. L. Freedlander, president and general manager, Dayton Rubber Mfg. Co., was recently appointed deputy chief, rubber and rubber products division, Office of Production Management.

H. E. Grout has been promoted from general foreman to superintendent, small motor division, Westinghouse Electric & Mfg. Co., Lima, Ohio. He joined the company at East Springfield, Mass., in 1925 and in 1937 was transferred to Lima as inspection fore-

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J & L Shifts District Sales Managers

J. B. DeWOLF

S. A. FULLER

E. W. HARWELL

John B. DeWolf has been shifted by the Jones & Laughlin Steel Corp. from New York to Washington as district sales manager. S. A. Fuller will succeed Mr. DeWolf as district sales manager in New York. Ernest W. Harwell, former district sales manager at Memphis, Tenn., becomes district sales manager in Chicago, while E. E. Hoehle, his assistant, becomes Memphis manager. R. J. Woods, Jr., has been appointed district sales manager of the newly created office in Tulsa, Okla.

man, later becoming manufacturing foreman.

Howard E. Fritz, manager of the synthetics division, B. F. Goodrich Co., succeeds James W. Schade as director of research. William S. Richardson succeeds J. H. Connors as general manager, mechanical goods and sundries sales.

M. J. Healey, formerly director of Deere & Co. and John Deere Plow Co., has joined the Machinery Section, Office of Price Administration.

H. Mansfield Horner, general manager, Pratt & Whitney Aircraft Div., was recently elected a vice president, United Aircraft Corp. He has been with the Pratt & Whitney staff since 1926. He will continue as general manager.

A. M. Johnson, sales engineer, Sundstrand Machine Tool Co., will serve on the technical staff, Office of Production Management.

W. L. Kennicott, previously Los Angeles sales manager, McKenna Metals Co. is now at the head office at Latrobe, Pa., in the management of sales and engineering of tools.

George E. Markley has been appointed sales manager, Radiant-Combustion, Inc.

Edward Molloy, works manager, was elected vice president in charge of manufacturing, Ryan Aeronautical Co. He joined the company 16 months ago after serving with the Curtiss-Wright Corp.

Charles R. Miller, Jr., former director of purchases, was elected vice president of purchases, U. S. Steel Corp. of Delaware. He also becomes a member of the executive committee and board of directors. He has long been associated with United States Steel subsidiaries.

George P. Passmore becomes works manager in charge of manufacturing at the Wellsville, N. Y., works, Worthington Pump & Machinery Corp. He had been manager of manufacturing, South Philadelphia works, Westinghouse Electric & Mfg. Co.

Howell Pritchard was promoted from assistant purchasing agent to purchasing agent, Kearney & Trecker Corp. Other company changes were: Carl Enroth named assistant to the works manager; Fred Suter, Jr. made foreman, bed type machine assembly department; Arthur Angostini named superintendent of safety, and Alex Malstron promoted to foreman, refining machine shop.

Dean Rollans has been elected vice president in charge of sales, and William H. Husted has been appointed assistant to the president, Wickwire Spencer Steel Co. Mr. Rollans has been connected with the company since 1928. Mr. Husted who joined the company recently will serve three days a week as consultant to the Raw Materials Division, Iron and Steel Unit, Office of Production Management.

James M. Skinner, Jr., has been appointed manager, accessory division, Philco Radio Corp. He succeeds C. E. Carpenter who will concentrate on export business.

PLANT EXPANSION

Exolon Co., Inc., will erect a $500,000 factory in Tonawanda, N. Y. An additional $125,000 is being spent for a building, additions and alterations at Blasdell, N. Y.

Firestone Tire & Rubber Co. is erecting a $170,000 plant for the manufacture of self-sealing gasoline tanks in Los Angeles, Calif.

Freuhauf Trailer Co. will erect a $100,000 addition to its factory in Los Angeles.

Western Pipe & Steel Co. has leased a 30-acre site in Los Angeles harbor on which it will build a $3,500,000 shipyard for construction of ice cutters and corvette-type craft for the government.

BUSINESS ITEMS

Baker Bros., Inc., have appointed Vandyck Churchill Co., 114 Liberty St., New York, N. Y. sales agents for New York, New Jersey and Connecticut.

J. G. Brill Co. announces that R. S. Hood, Jr., district sales manager, has transferred his offices from St. Louis to 423 South Field St., Dallas, Tex.

Berger Mfg. Division, Republic Steel Corp., has appointed S. P. Flenniken, Jr. the branch office manager in Chicago. He will be succeeded by Allen C. Rudy as manager, Indianapolis office.

Carnegie-Illinois Steel Corp. established a full district office in Buffalo with William G. Crook as manager of sales.

Darwin & Milner will be represented in Ohio by C. Carnahan of Cleveland and in western Pennsylvania and West Virginia by Taylor H. Beech of Wilkinsburg, Pa.

Jessop Steel Co. appointed R. E. Bingman district manager for the Indiana territory with headquarters at 617 Architects and Builders Bldg., Indianapolis, Ind.

Mackay Machines is the new name of the E. J. Allen Machine Co., 10-49 Forty-seventh Rd., Long Island City, N. Y.

Mine Safety Appliances Co. of Canada, Ltd., have established headquarters at 139 Kendal Ave., Toronto.

Oakite Products, Inc., has established new divisions for New England and the Southwest. T. R. Smith is New England division manager, with headquarters at 410 Asylum St., Hartford, Conn. S. C. Shank will be south western di-

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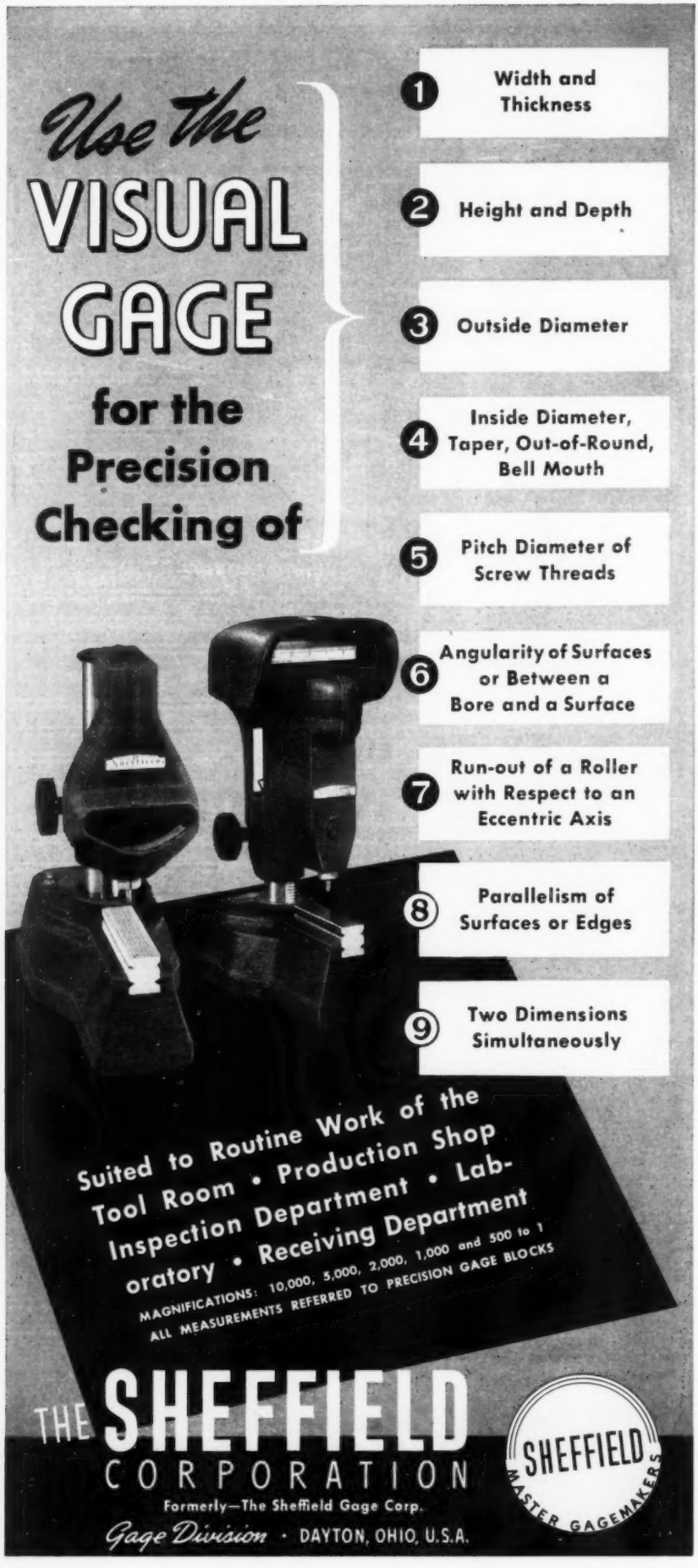
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vision manager with headquarters in St. Louis.

Name of the Surface Combustion Corporation is changed to Surface Combustion Division of General Properties Company, Inc. This change will not affect the organization or its operations.

OBITUARIES

Arthur Aigeltinger, 58, vice president, American Brake Shoe & Foundry Co., died Dec. 31 in Baltimore. He had been connected with the company and its subsidiaries since 1908, serving as chief engineer, vice president and president of the Manganese Steel Rail Co., and as vice president and president of American Malleables Co.

Miss Nelly A. Bennett, secretary and treasurer, Worcester Gear Works, Inc., died recently in Worcester.

Robert Brown, 76, president and founder, Burrard Iron Works, Ltd., Vancouver, B.C., died recently in North Vancouver.

Ernest S. Craig, vice president, Nicholson File Co., died recently in Providence, R. I. He joined the company in 1894 and became assistant to the president in 1911. He had served as secretary and as assistant general manager before being elected vice president in 1939.

Frank E. Kuntz, assistant plant manager, Chevrolet-Bloomfield Div., General Motors Corp., died Dec. 30 in Montclair, N. J. He joined General Motors in 1921 and went to Bloomfield when the plant was established in 1925. There he served as materials superintendent and later as plant superintendent.

W. Kenneth Norton, 45, manager, General Motors Corp., defense materials office in Washington, died Jan. 8 in Cocoa Rockledge, Fla. He was former distribution manager, General Motors Overseas operations.

MEETINGS

American Management Association, Annual Personnel Conference. Stevens Hotel, Chicago, Ill., February 4-6.

American Society for Testing Materials. Spring Meeting. Cleveland, Ohio, Mar. 4.

American Society of Tool Engineers. Annual meeting. St. Louis, Mo. March 26-28.

National Electrical Manufacturers Association. Convention. Palmer House, Chicago, Ill., February 2-5.

WE'VE KEPT THE HOME FIRES BURNING SINCE CHRISTMAS 1939 . . .

The furnaces in our melt shop have never been cold since Christmas 1939.

We realized then as we realize now that these furnaces must operate at top capacity to produce the steel and the tubes needed for our defense.

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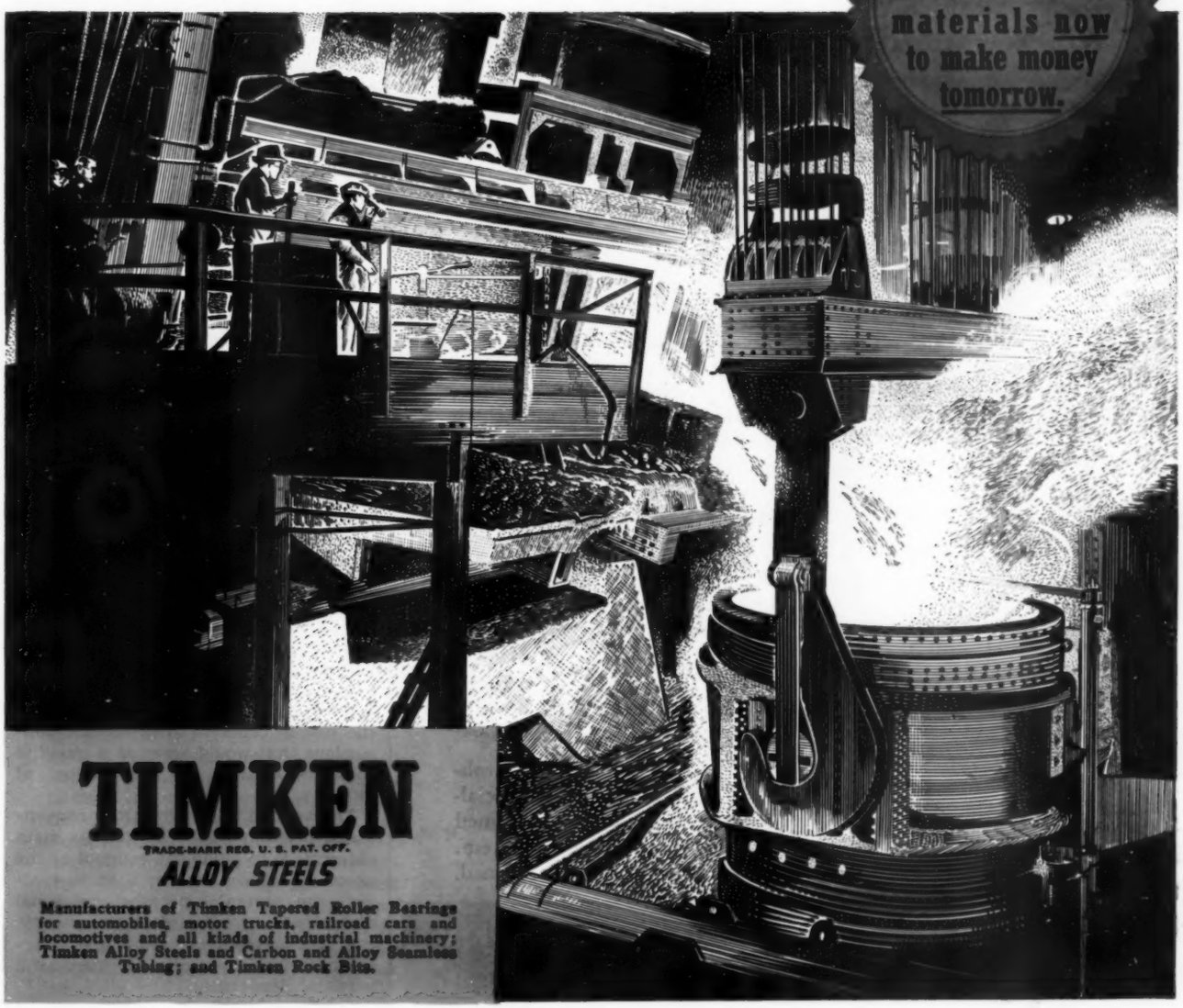

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TRADE-MARK REG. U. S. PAT. OFF.
ALLOY STEELS

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

ROEBLING *Wires*

ROUND · FLAT · SPECIALTY

THIS TAPE STEEL *Can Take it!"*

ROUND HIGH AND LOW CARBON COMMON AND SPECIALTY WIRES

Hard Drawn, Soft Annealed or Tempered, in all Finishes—Bright, liquor Finish, Coppered, Tinned, Galvanized.

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Hard Rolled, Annealed, Scaleless Tempered; Tempered and Polished, Tempered, Polished and Colored; Various Finishes—Bright, Tinned, Coppered, Hot or Electro Galvanized.

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Various High or Low Carbon Shaped Wires such as: Shaft Casing Wires, I Beam Sections, Space Block Wires, Square, Keystone, Oval, Half Oval, Half Round, etc.

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Here's a strip steel that must withstand real punishment—constant yanking, coiling, tangling, bending! It's a cold-rolled high carbon flat, tempered, polished, and blued—an excellent example of our ability to meet *extremely exacting* specifications.

This fine spring steel—also available tempered and polished—has great toughness and resiliency, high tensile strength, and uniform temper held within very close limits. It is also very accurate dimensionally and notably free of defects on the surface and edges.

Bring your difficult wire problems to us. We have the specialized experience and the trained organization to handle them. Your inquiry would be welcomed.

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NEW BOOKS

RUNNING A MILLING MACHINE—*By Fred H. Colvin, editor emeritus, American Machinist.* 157 *pages. Published by McGraw-Hill Book Company,* 330 *West* 42 *Street, New York, N. Y.* $1.50.

While this book is not a complete treatise on all the problems involved in the operation of milling machines, it makes clear the general construction of the different types of millers, and gives a good idea of the kind of work they do. Further, it shows how the different machines operate, points out the necessity of having the work firmly clamped and the cutter sharp, and gives the student much of the basic knowledge necessary if he is to become a first-class milling machine operator. Beginning with the hand miller, which is the simplest machine of this type to learn how to operate, the book describes all of the various types. Examples of work shown come from many plants, including automobile and railroad shops.

Various types of milling cutters are described in detail, and much practical information regarding their care is included. An entire chapter is given over to the question of proper speeds and feeds for milling, and another describes methods of setting cutters for different kinds of work. Work holding vises and fixtures are described in detail, as are various methods of clamping the work. The dividing head and its operation is described in detail, and the reader is told how to calculate change gears for indexing, and for cutting helices.

•

PERSONAL LEADERSHIP IN INDUSTRY—*By David R. Craig, president, The American Retail Federation, and W. W. Charters, director, Bureau of Educational Research, Ohio State University.* 245 *pages. Published by the McGraw-Hill Book Company,* 330 *West* 42 *Street, New York.* $2.50.

In this crisis it is recognized that sound industrial leadership is more important than ever before. It is timely, therefore, for an up-to-date revision of this volume which is, in reality, a handbook on executive technique.

The authors have based their book on an extensive study of successful and unsuccessful methods used by a wide number of industrial executives in both major and minor categories. From their studies, they sifted the good from the bad in order to draw specific conclusions that would serve as a guide to those responsible for the conduct of industry.

The volume differs from the conventional personnel book in that its main objective is to guide tne conduct of the executive himself, rather than to evaluate the general sources of industrial discontent. Iit is based on the premise that the development of sound character traits is essential to successful personal leadership.

PLANT PRODUCTION CONTROL — *By Charles A. Koepke, professor industrial engineering, University of Minnesota. 509 pages. Published by John Wiley and Sons, 440 Fourth Ave., New York, N. Y.* $4.00.

Production control as dealt with in this volume means the production of the maximum amount of goods at the minimum cost. It is frankly recognized that no one system will serve for any wide number of plants. However, there are basic functions underlying all manufacturing operations which have much in common and upon which any sound system of control must be based. In preparing this volume, Professor Koepke has supplemented notes gathered in teaching with personal studies of industrial plant operations, selecting those plants that have achieved notable success in this direction.

Starting with a brief historical survey of manufacturing problems, the volume takes up one at a time such specific activities as inventory control, plant maintenance, machine replacement, production estimates, economic life and planning records, to name only a few of the many phases dealt with. The author draws freely on papers and articles that have appeared in publications and other books dealing with related subjects.

In order to give maximum value as a text and reference book, a series of questions and a bibliography conclude each chapter.

•

TESTS OF CYLINDRICAL SHELLS — *By Wilbur M. Wilson, research professor of structural engineering, and Emery D. Olson, special research graduate assistant in civil engineering, University of Illinois. Engineering Experiment Station Bulletin, Series No.* 331. 132 *pages.* Published *by the University of Illinois, Urbana, Ill.* $1.00.

This report of an investigation conducted by the engineering experiment station of the University of Illinois in cooperation with the Chicago Bridge & Iron Company reports on the action of thin cylindrical steel shells when subjected to axial compression, transverse shear, and flexure, singly or in combination. Tests were made on small machine specimens and large separate headed shells.

The methods of loading included: axial loads, transverse loads, and combined axial and transverse loads. The methods of failure that were studied included: (a) wrinkling caused by longitudinal compression induced by axial loads, by flexure, or by a combination of the two; (b) wrinkling caused by diagonal compression induced by shear; (c) circumferential compression induced by shear at supports that completely enclosed the shell; (d) circumferential movement in supporting rings that completely inclosed the shell and (e) circumferential movement in a shell at pedestals that did not entirely enclose the shell.

As a private in the ranks, Ross has enlisted for "the duration."

In such matters as government need for air control valves, Ross expects to be a good soldier. . . . To do its part well and willingly—as it knows you will do your part.

United effort will surely bring VICTORY!

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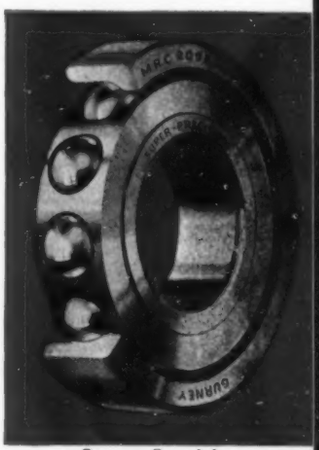
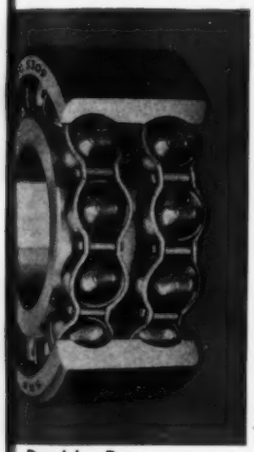
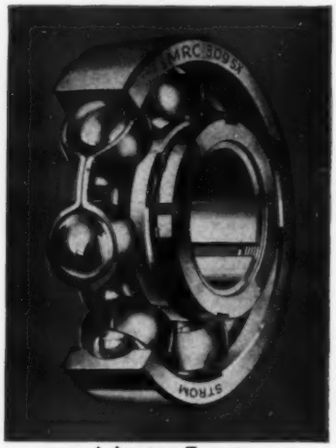


Super-Precision



Double-Row



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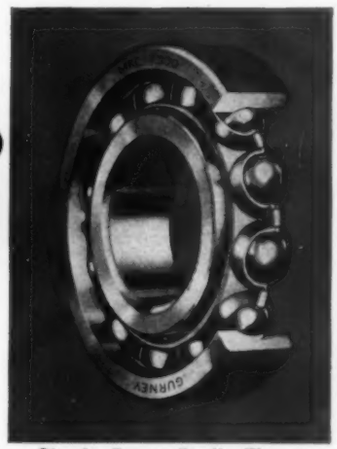
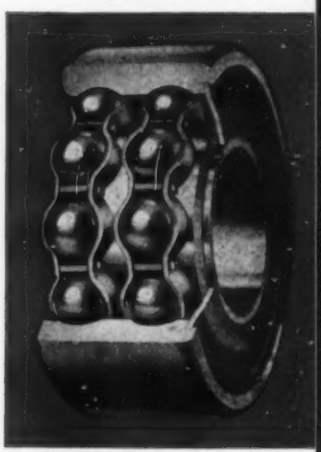
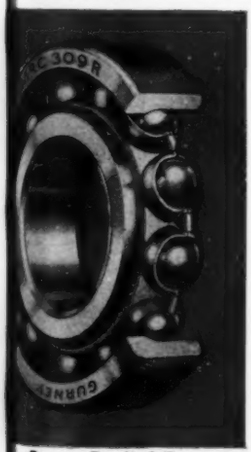


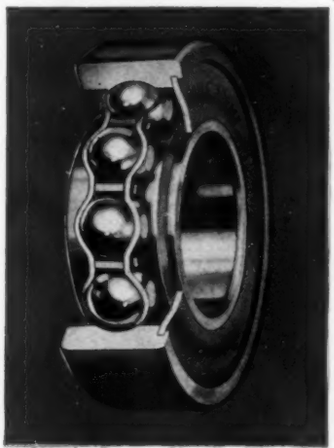
Single-Row—Radio-Thrust



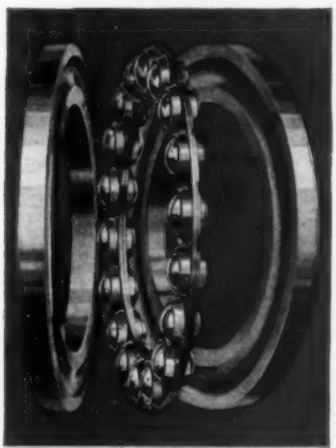
Double-Row—Shielded



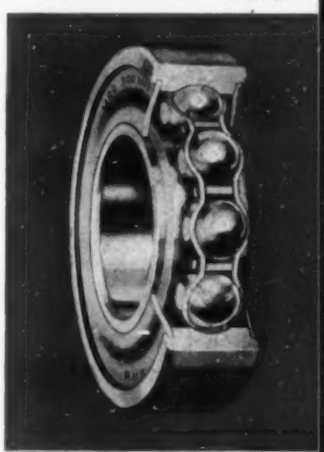
e-Row—Radial Type R



Single-Row—Single-Shield



Flat-Thrust



Single-Row—Double-Shield

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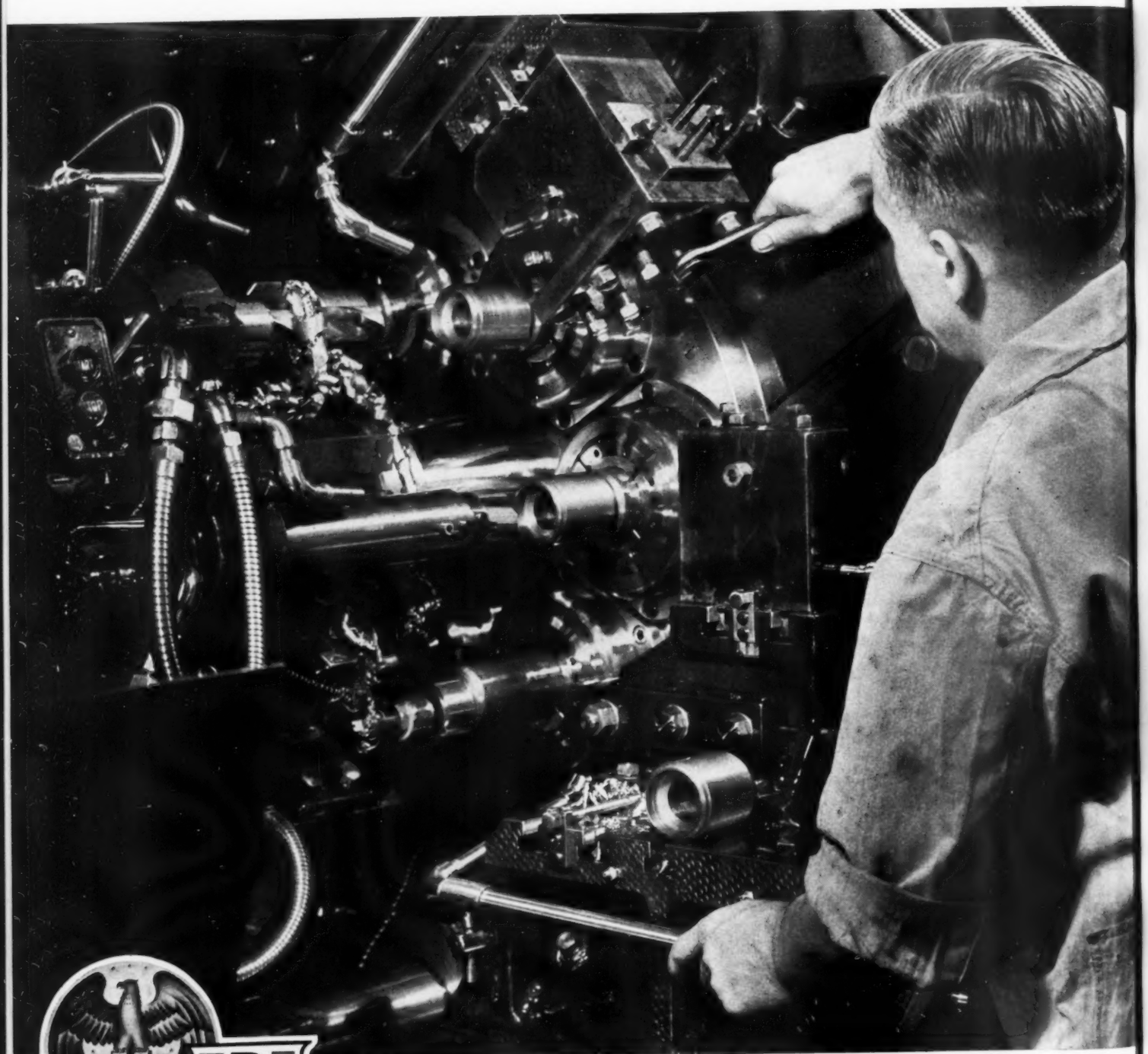
Steel Parts Production



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TO STEP UP *with* UNION SUPERCUT

–the fastest-machining Bessemer Screw Steel made today

If you've never used UNION SUPERCUT, you've never known how much this *improved* high-sulphur Bessemer Screw Steel may help you step up your steel parts production.

UNION SUPERCUT is the fastest-machining Bessemer Screw Steel made today—because it was developed for high machinability—because it has been improved time after time, with each improvement further increasing its free-machining characteristics. As compared with ordinary Bessemer Steel, SUPERCUT frequently has raised output 50% to 100%—sometimes as much as 200% and higher when equipment permitted.

In steel parts production, part design, machines, tools and the set-up may necessitate variance of speeds and feeds to obtain best results in each instance. But in almost every case, the table at the right giving recommended cutting speeds and feeds will prove helpful as a guide in using UNION SUPERCUT. It should be remembered that these figures are approximate—and that they represent averages for the general run of steel parts.

Usually, die chasers for use with UNION SUPERCUT should be ground with a hook of 10°. Threading surface speeds of 60 to 80 feet a minute may be used. For average work, the regular drill point of 59° will be satisfactory.

And high machinability is only one of SUPERCUT'S advantages. It is uniformly sound throughout bar after bar, and remarkably free from the abrasive elements that wear tool edges. It machines to a smooth, bright surface.

Throughout the series of developments to improve machinability, UNION SUPERCUT has sacrificed none of its physical properties, as indicated by these figures for one-inch round, cold drawn:

Tensile Strength . . . 80/95,000 lbs. per sq. in.
Yield Point . . . . . 70/80,000 lbs. per sq. in.
Elongation in 2" . . . 10/20%
Reduction of Area . . 40/50%
Brinell Hardness . . . 170/202

UNION SUPERCUT responds to cyaniding and carburizing. Best core strength is produced when quenched at 1600° F. from cyanide. Like all Bessemer steels, however, core strength is comparatively low, and SUPERCUT should be carburized only to develop a hard wearing surface.

Yes, it's a "set-up" to step up steel parts production with UNION SUPERCUT—especially if you are equipped with late model "automatics" capable of higher speeds. However, SUPERCUT will show to advantage on all types of equipment, since heavier feeds may be used even though speeds cannot be increased, and tool life is extended.

The experience, advice and assistance of Union Drawn metallurgists and engineers are available to all users of Union Cold Drawn Steels. Take advantage of this valuable service whenever you may encounter difficulties or problems that handicap high speed parts production. Union Drawn Steel Division, Republic Steel Corporation, Massillon, Ohio.

CUTTING SPEEDS AND FEEDS FOR STANDARD TOOLS WITH UNION SUPERCUT

The table below is based on the use of high speed steel tools and an average eight hour tool life. Feeds are based on the use of multiple spindle type machines using both rough and finish forming tools. On lighter, single spindle machines using only one forming tool, feeds are usually much lower.

TOOL NAME	Size of Hole—Inches	Width or Depth of Cut—Inches	Surface Feet	Feed—Inches
Form Circular or Dove-Tail		Width .500	225	.003
		1.000	210	.0025
		1.500	210	.0025
		2.000	205	.0018
		2.500	200	.0015
Twist Drills	.250		125	.0054
	.500		125	.006
	.750		140	.007
	1.000		140	.008
	1.250		145	.009
Box Tool Blades		Depth .125	225	.0085
		.250	210	.008
		.375	205	.0065
		.500	200	.0055
Hollow Mills		.062	200	.012
		.125	186	.0096
		.187	179	.0084
		.250	172	.0073
Knurl Tools In Turret { On			225	.020
Knurl Tools In Turret { Off			225	.040
Knurl—Cross Slide			225	.020
Chamfer & Facing			280	.008-.010
Reamers	under 1/2"		180	.0085
	1/2" or over		180	.012
Cut Off		Width .062	225	.003
		.125	230	.0035
		.187	235	.0035
		.250	250	.004

Drawn Steels

Discoveries...

while Building for Victory

Finer Metal Fabrication for the Machine Bases of Tomorrow ...through Van Dorn Research

Right now, every industry must be on the alert. For out of arms production is coming an abundance of discoveries in new metals and fabricating processes. They're building for Victory today. But tomorrow, they'll serve a new era in peacetime production.

Today's high-speed, highly-developed processes of building faster planes, sturdier ships and more powerful tanks and guns will be the accepted methods of producing better machine bases, machinery and tools for tomorrow. This transition is already under way. Keep up with it.

Van Dorn—master of metal fabrication for 64 years—has a vast research organization at work investigating war-time manufacturing discoveries to the limits of their peacetime possibilities in machine base construction. Analyzing new metals, experimenting with new processes of welding, heat treating and machining, devising new principles of design—all important factors in machine development plans.

Take advantage of this broad Van Dorn research work now. Without cost or obligation, Van Dorn engineers will work with you. Call them in for discussion. Write, wire or phone.

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ALUMINUM, THE FUTURE, AND YOU

RIGHT NOW OUR FACTORIES have only one interest: to make more Defense Aluminum than the world has ever seen before. Every resource we can muster is concentrated on that job.

WHEN AMERICA HAS WON THROUGH to make the world safe for our children to live in . . . the saying is: What a lot of aluminum is going to be available for everybody.

THE REAL POINT TO PONDER is how to get set to make that deluge of light metal work for you. In the kind of world we're going to have, sure as fate, the man who fails to call, *now,* on every resource at his command is going to be left at the post.

WE'VE COINED A WORD:

IMAGINEERING. It's the fine art of deciding where you go from here. It's the act of thinking out what you are going to face, and doing something about it now. *Imagination* plus *engineering* is a formula for the future you're going to hear more about.

A MAN CAN be producing for Defense at top speed and be imagineering at one and the same time. In fact, the more he is devoted to Defense now, the more he needs imagineering for ***THE DAY WHEN.***

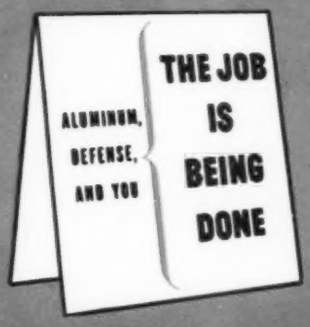
OBVIOUSLY, you can imagineer with steel, copper, glass, zinc, plastics, or what have you. We hope you will, because the world is going to need better use of all materials than it ever saw before.

THE CLOSER YOU GET TO FUNDAMENTALS the more quickly you must decide that the great need is going to be for the very things Alcoa Aluminum does best: Lightness with strength, resistance to corrosion, reflectivity, workability and all the rest of its powers all wrapped up in a low-cost package full of unlimited possibilities for you, personally, in your business.

TWO HEADS ARE BETTER THAN ONE. Already, many an industry, many a company, has called us into an imagineering session. We've seen things projected that will make news when the curtain can be lifted. Usually we've been able to help with some imagineering of our own.

DOES THIS SUGGEST ACTION? WE HOPE SO.

Aluminum Company of America, Pittsburgh, Penn.



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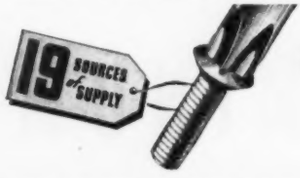
Assembly jobs that demand extra patience and plenty of time when using slotted screws, can now be handled . . . in a rush . . . by green men . . . who work with Phillips Screws.

Most important — there's no danger of screwdriver slippage. The driver can't slip from the Phillips recess . . . so faster driving methods are practical. Electric and pneumatic power drivers on many jobs where their use had previously been restricted.

Operations are simplified, too. One-hand starting and driving. Perfect control even when the operator is in an awkward position. No chance for crooked screws, split screw heads or other time wasters.

Altogether, you can depend on *twice the assembly production* with Phillips Screws! Remember *that* for today's conditions when you're interested in saving time. Remember it for tomorrow's conditions when you may be *more* interested in saving cost!

Any of the firms listed below can supply further information.



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GIVE YOU 2 for 1 (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS • SCREWS WITH LOCK WASHERS

U. S. Patents on Product and Methods Nos. 2,046,343; 2,046,837; 2,046,839; 2,046,840; 2,082,085; 2,084,078; 2,084,079; 2,090,338.
Other Domestic and Foreign Patents Allowed and Pending.

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Pheoll Manufacturing Co., Chicago, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Manufacturing Co., Waterbury, Conn.
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Speed Ranges up to 16 to 1
Sizes 1 to 30 hp.

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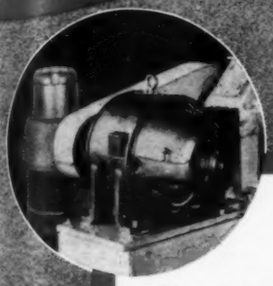

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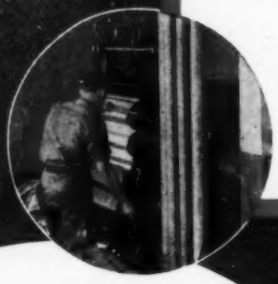
The drive can be arranged to give very slow speeds while threading material by hand or setting up work.



SPEED CHANGES

Smooth changes over ranges up to 16 to 1. Wider ranges under special conditions . . . Speeds can be adjusted while machine is in operation.

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Obtained electrically either by operation of speed adjuster handle or *stop* button.

CONTROLLED ACCELERATION

Torque is provided to suit the job. No clutches are needed. Acceleration is smooth so that driven machine and material in process are not subjected to undue shock or strain.

SPEED SETTING

When set for a given operation the motor may be stopped and started without interfering with the speed setting.

All within Easy Reach

The Reliance V*S Drive provides convenience without limitations. Speed changer and start-stop station can be placed anywhere that you can run a wire.

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RELIANCE A-C D-C MOTORS

YOU'VE probably heard the radio quiz program that starts with an easy question worth one dollar, then gets harder and harder with each correct answer doubling the prize up to $64. There are lots of small prize winners—very few can answer the $64 question.

There are many good motors available for standard jobs — for power questions with easy answers. But the power question we like to solve is the one that says, "We must have a torque motor of so many foot pounds. It must stall and reverse. It must have a specific shaft size. It must be mounted in an unusual position. There's not much room, it's got to fit into such and such a space."

Got any $64 questions you want answered? If there *is* an answer, we have it.

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of pure copper or gilding metal. If you prefer to do your own cutting, we can give you full lengths of seamless tubing. • L-M copper tubing in coils or straight lengths is also available for other priority defense purposes. • Our electrolytic copper refinery and our own tube mill are located on the same ground. Our modern equipment, our large production facilities, our central location enable us to make

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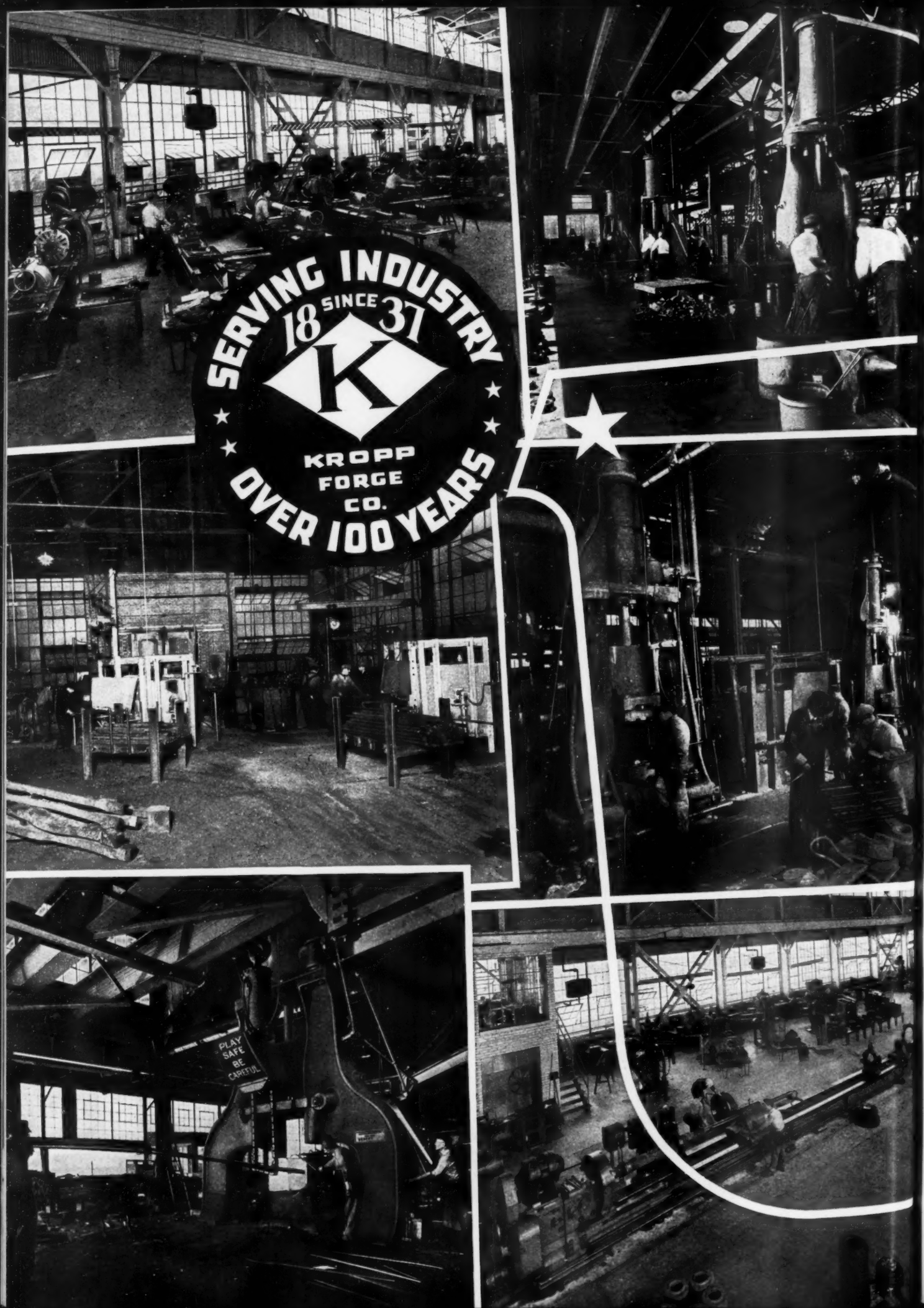
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In increasing and improving our production facilities for making hammer, drop and upset forgings to fill the needs of today's defense program, we have kept an experienced eye on the future needs of industry. As a result, when today's emergency is over, we will be in a better position than ever before to serve the wants of our many friends in industry with better forgings at lower cost. The equipments, practices and production methods required by the high speed demands of today will go a long way in solving tomorrow's forging worries.

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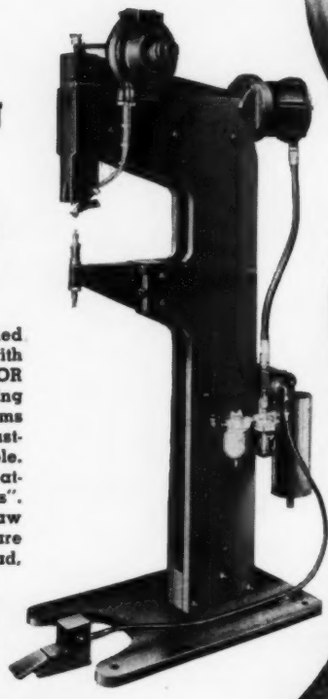
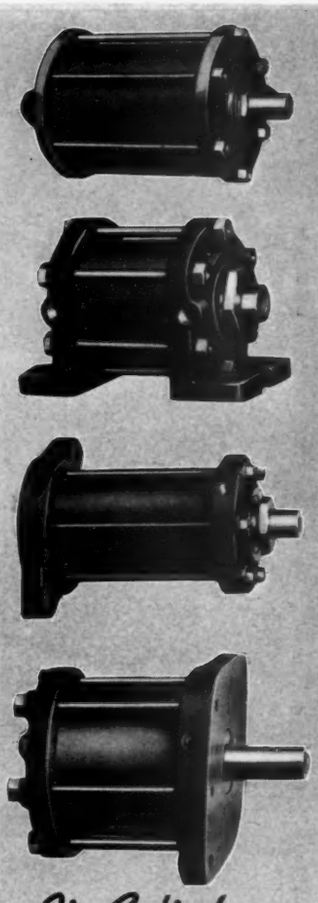
New

TOMKINS-JOHNSON
Air Powered
RIVITOR

(for aircraft production)

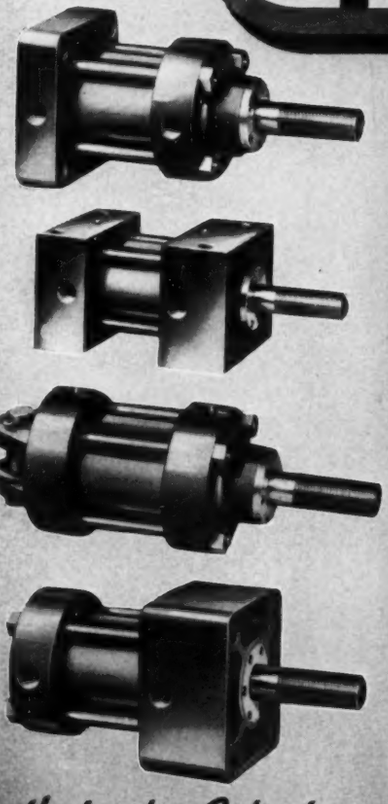
Furnishes "air squeeze" action combined with automatic feed riveting. In keeping with established T-J quality, this new RIVITOR contains many cost-cutting, efficiency building features — feeding and setting mechanisms are automatic . . . setting tools are adjustable . . . horn section is interchangeable. Steel side plates, base plate and non-repeating foot pedal operations, are other "pluses". By using a different type rivet set and jaw construction, Counter Sunk Head rivets are handled, as well as Flat Head, Round Head, Full and Semi-Brazier Head Rivets. This new, high production T-J Air Powered Rivitor is your best choice for work within its range . . . write for production data, prices and deliveries, address to Dept. A.





Air Cylinders

T-J



Hydraulic Cylinders

EQUIPMENT

HELPS ATTAIN MAXIMUM SPEED IN PRODUCTION!

Increased performance and machine efficiency, plus greater handling convenience, are a few of the many advantages T-J products bring to machines and equipment engaged in today's high pressure defense production requirements.

T-J products . . . air and hydraulic cylinders . . . are easily and quickly installed . . . they become an integral part of the machine to which they are applied.

T-J AIR CYLINDERS

These units exert power movement from 100 lbs. to 12,000 lbs. (direct). Made in styles, sizes and strokes to meet your requirements.

T-J HYDRAULIC CYLINDERS

Designed and furnished in types and sizes to exert power movement from 1,000 lbs. to 50,000 lbs. (direct). Available to meet your specifications.

A new section of our plant (about 21,400 sq. ft. more floor space) is now nearing completion, and is adding effectively to our productive capacity.

Our engineers are eager to help you step up production through the application of T-J products. Consult with them, regarding your requirements. Write for detailed data, address to Dept. A.

THE TOMKINS-JOHNSON CO.

Jackson . . . Michigan

Machining Speeds up to several thousand feet per minute, deeper cuts, heavier feeds, and often with longer tool life; there's a faster tempo to metal-working operations when your plant is processing Mazlo Magnesium Products. Thus is Magnesium helping to speed the production of vital defense materials.

Standard metal-working practices are followed with Magnesium. It takes a smooth finish and tolerances can be held to close limits. A wealth of helpful information—recommended tool rakes and clearances, cutting speeds and feeds, and similar data—is now available on the working of Magnesium.

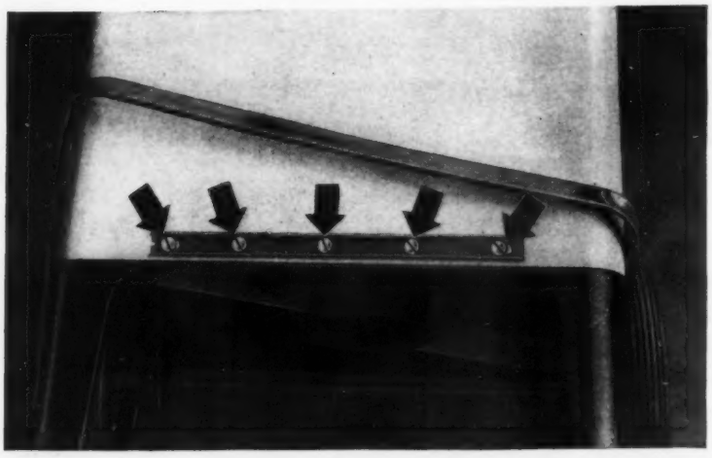
What is being learned today about the fabrication of Mazlo Magnesium Alloy Products will be available tomorrow for peacetime production. Then, all users of this lightest of lightweight metals—Magnesium—will profit by today's gigantic push for production. Sales Agent for Mazlo Magnesium Products: Aluminum Company of America, 1709 Gulf Bldg., Pittsburgh.

AMERICAN MAGNESIUM CORPORATION

SUBSIDIARY OF ALUMINUM COMPANY OF AMERICA

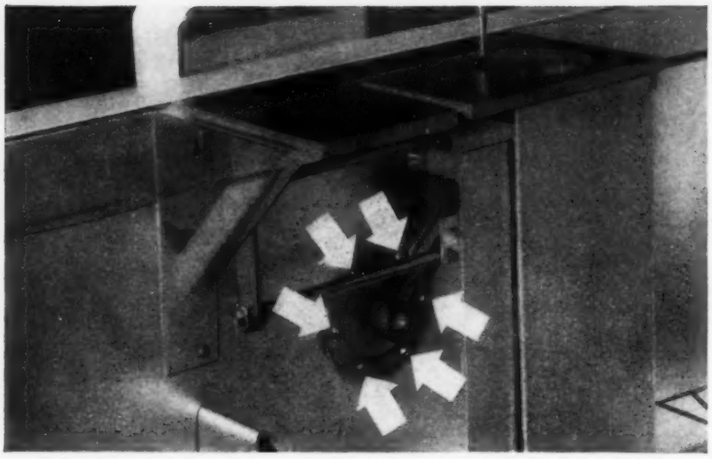
MAZLO MAGNESIUM PRODUCTS

CAN YOU *stretch a*



Simplify ASSEMBLY . . .

Dual assembly made in one simple operation! The same Self-tapping Screws fasten a molding retainer to the housing, and the housing to the cast iron base of a battery charger made by Hammett Electric Mfg. Co. P-K Screws also make it easier to attach instruments to the unit.



Save OPERATIONS . . .

Here, Self-tapping Screws hold a rubber gasket in place around the coin box shaft of the Vendall Selective Dispenser. "No tapping needed! Production decidedly speeded up – costs reduced – that's why Parker-Kalon Self-tapping Screws are preferred in our production line", says the Friend Mfg. Co.

Cut Out SLOW UPS . . .

Many thousands of dollars were invested to set-up this Parker-Kalon Quality-Control Laboratory. Here, rigid control protects against "doubtful screws" . . . screws that look all right but some of which fail to work right. There are no "slow-ups" when you specify *Parker-Kalon!* Every screw starts easily – drives in fast – holds tight!

SELF-TAPPING SCREWS FOR EVERY METAL AND PLASTIC ASSEMBLY . . . AND OTHER FASTENING DEVICES

work-week to 8 DAYS?

It HAS been done on many assembly jobs – A P-K Assembly Engineer may point the way for you!

Whether you make planes, tanks, bombers, or any of the thousands of other products for defense, or for essential civilian needs, in today's vital task of getting more assemblies per man-hour, a Parker-Kalon Assembly Engineer can be a big help! He can help you effect time-savings of 25 per cent to 50 per cent in the many assemblies suited to Parker-Kalon Quality-Controlled Self-tapping Screws. Wherever the P-K Engineer uncovers a place to use this simpler method . . .

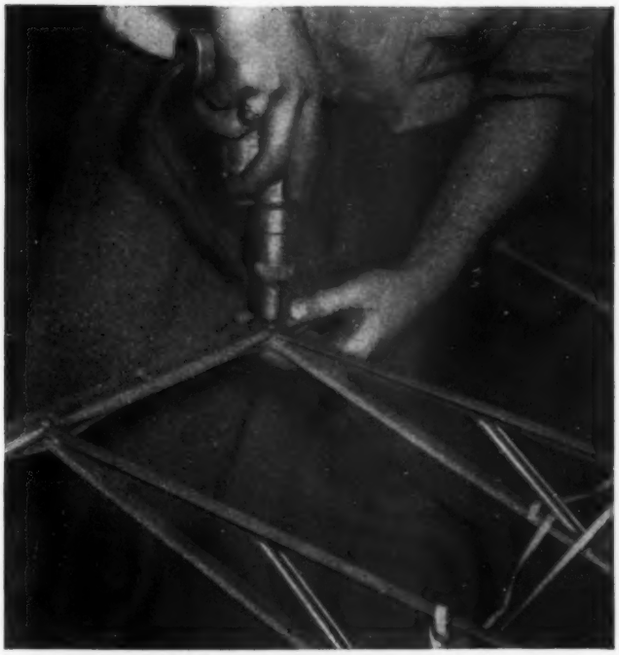
You make a triple saving that adds extra man hours of production time to your work-week. You *simplify assembly!* You *save operations!* You *cut out slow-ups!*

How can you obtain all the benefits of this simpler, better fastening method? Get together with a Parker-Kalon Assembly Engineer without delay and search out all opportunities to apply Self-tapping Screws. You'll find that he knows present day assembly practices – on all sorts of products – from the ground up. You'll find him practical . . . he is pledged to recommend Self-tapping Screws only when they offer a better, more economical means of assembly. And, he is unbiased because Parker-Kalon makes all types of Self-tapping Screws – both thread-cutting and thread-forming.

Sheet-metal, heavy steel, die castings or plastics . . . no matter what material your production uses, the chances are 7 out of 10 that a Parker-Kalon Assembly Engineer can help you speed-up fastening jobs with Parker-Kalon Self-tapping Screws.

No Need to Interrupt Production!

It's an easy change from slower, more costly methods to Self-tapping Screws. No major production changes necessary . . . no special tools or skilled hands required.



TAYLORCRAFT SPEEDS ASSEMBLY *of planes for Civilian Pilot Training Program by using Parker-Kalon Self-tapping Screws for many applications. The assembly shown above is typical.*

• • •

Start Getting More Assemblies Per Man-Hour – NOW!

Write for the Parker-Kalon Assembly Engineer to schedule a call at your plant to give you the benefit of his specialized knowledge. Or submit full details of assemblies and we'll mail recommendations and samples. Parker-Kalon Corp., 194-196 Varick Street, New York.

PARKER-KALON

Quality-Controlled

SELF-TAPPING SCREWS

Give the Green Light • to Defense Assemblies

1

A Suggestion of the Thousands of Uses for Wyckoff Cold Finished Steel

Aircraft
Aircraft Detectors
Anti-Aircraft Guns
Anti-Tank Guns
Blue Print Machines

Bomb-sights
Bomb Timing Devices
Boring Machines
Cannon
Compasses

Conveyors
Depth Bombs
Detonators
Die Blocks
Diesel Engines

Electric Controllers
Fire-Control Mechanism
Forging Presses
Foundry Machinery
Gasoline Engines

Generators
Grenades
Half-Trac Trucks
Hoists
Jeeps

Lathes
Lifting Jacks
Listening Devices
Locomotives
Machine Guns

Magnetic Mines
Merchant Ships
Micrometers
Mining Machinery
Mortars

Oil Well Drilling Machines
Press Brakes
Range-Finders
Shoe Machinery
Steam Engines

Stokers

IN THE HEART of Hundreds of Machines of Defense and Essential Industries

WYCKOFF
COLD FINISHED STEEL
. . . BLENDS EFFICIENCY, DURABILITY AND LOW COST

Cold Finished Steels have made possible the development and economic success of hundreds of mechanical advancements and industries by supplying the strength, durability, easy workability, precision and smooth surface so necessary to the moving parts of today's machines of industry . . . combined with low cost and mass production capabilities.

These same qualifications have called the entire production of Wyckoff Cold Finished Steel to the services of Defense and essential industrial requirements.

WYCKOFF DRAWN STEEL COMPANY

Submarines
Surgical Instruments
Telephones
Torpedoes
Tractors

Traffic Controllers
Warships

First National Bank Bldg., Pittsburgh, Pa.
3200 South Kedzie Ave., Chicago, Ill.

Mills at Ambridge, Pa., and Chicago, Ill.

Warehouse Stocks in Principal Cities

Manufacturers of Carbon and Alloy Steels . . . Turned and Polished Shafting . . . Turned and Ground Shafting . . . Wide Flats up to 12 inches by 2 inches

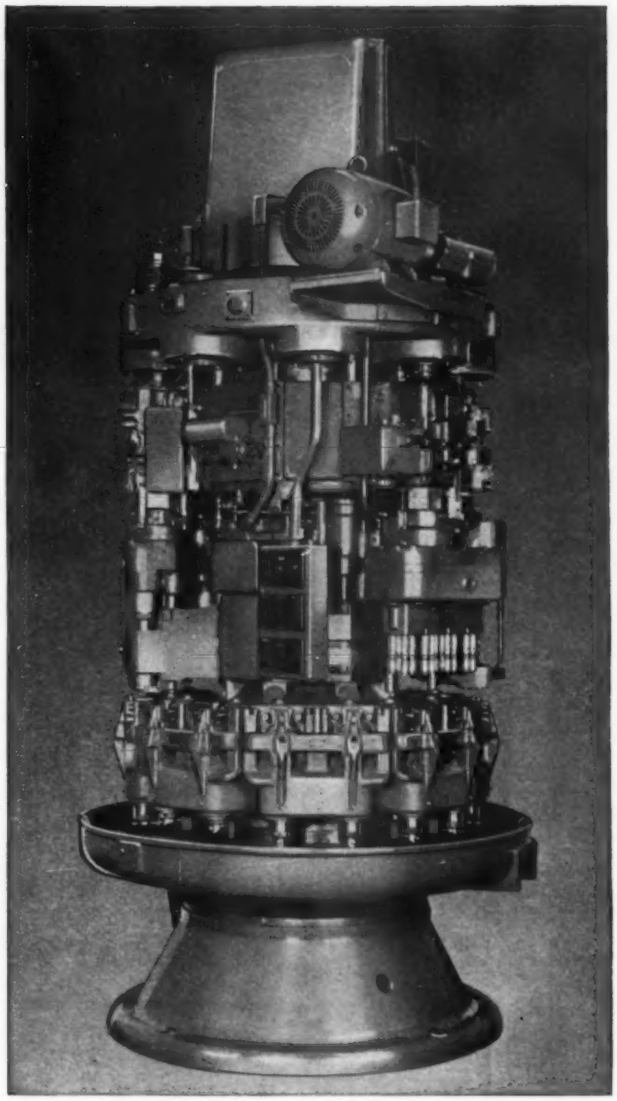
NO MACHINE CAN BE MORE ACCURATE THAN ITS BEARINGS

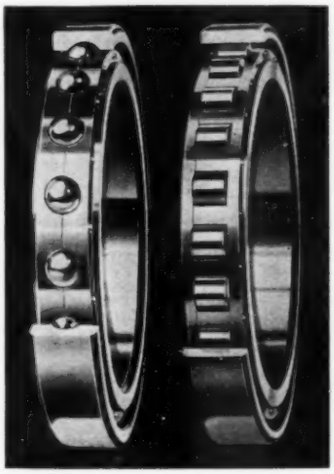
So

W. F. & John Barnes Company

Uses

NORMA-HOFFMANN PRECISION BEARINGS





The NORMA-HOFFMANN "XLS" Extra Light Ball Bearing—and the "RXLS" Extra Light Roller Bearing—(both made in a size range from 1⅜" to 22½" bore) afford machine builders definite advantages and greater latitude in design, being distinguished by compactness, light weight, comparatively large load capacity and extreme PRECISION.

The tool illustrated is an Eight-Station Center Column Machine, in which NORMA-HOFFMANN "XLS" EXTRA LIGHT BALL BEARINGS are employed to support and accurately locate the center column. Regarding the performance of this tool and of these bearings, the manufacturer writes:—

"In order to hold close tolerances on our Center Column Machine, under high and continuous production, it was necessary for us to secure a bearing with which we could index our fixture trunnion *TO WITHIN PLUS OR MINUS .001" AT THE EXTREMITY OF A 20" RADIUS.* With your "XLS" Bearing and additional guide brackets from spindle heads to fixtures, we can consistently *HOLD LIMITS TO "TENTHS" ON WORK PART*—accuracy which we were unable to obtain with any other bearings."

There are 108 distinct series and over 3000 sizes of PRECISION BEARINGS in the NORMA-HOFFMANN line—a bearing for every load, speed and duty Discuss YOUR bearing problems with our engineers, without obligation. Write for the Catalog

NORMA-HOFFMANN BEARINGS CORP'N., STAMFORD, CONN., U.S.A. • FOUNDED 1911

PRECISION BALL, ROLLER and THRUST BEARINGS

"Commercial" ANNULAR BALL BEARINGS

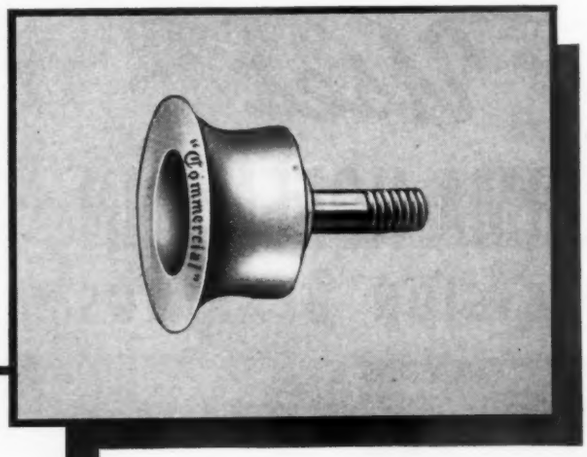
for Every Industrial Purpose

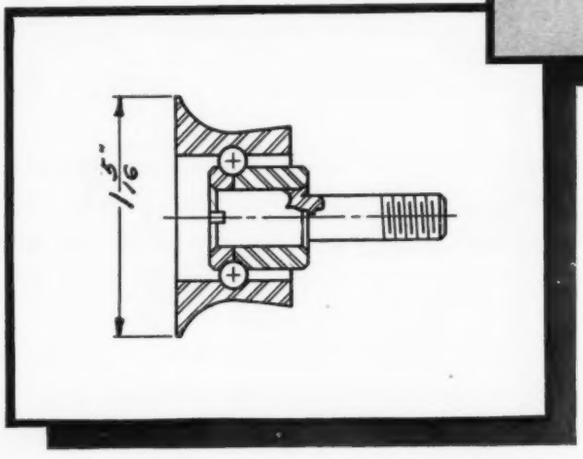
"Commercial" Annular Ball Bearings are adaptable to any product or machine in which ball bearings are used—standard types and sizes or bearings of *original* design for unusual and difficult installations.

For over a quarter century, manufacturers in hundreds of different industries have bought and used **"Commercials"** for the reason that these bearings give longer and better service at less cost.

Increased Efficiency

We illustrate a specially designed ball bearing roller with threaded stud used in connection with the mechanism for raising and lowering a typewriter in a desk or table. Smooth, fast, easy operation with a minimum of physical effort. A modern, up-to-date improvement made possible by **"Commercial"** Ball Bearings.





Simple Construction

The cross section view of this ball bearing roller shows the frictionless simplicity of design and construction. Made of high grade steel, cadmium plated and carefully finished. The basic design, with changes in dimensions and details, is usable in many different kinds of service.

LET OUR ENGINEERING STAFF SOLVE YOUR BALL BEARING PROBLEMS

We have the experience, facilities and skill necessary for solving the most intricate ball bearing problems and our Engineers will be glad to cooperate with manufacturers in every industry who seek *specially* designed or standard ball bearings for any and all industrial purposes.

THE SCHATZ MANUFACTURING CO.
POUGHKEEPSIE, N. Y.
Detroit Office: 2640 Book Tower • Chicago Office: 902 S. Wabash Ave.
Cleveland Office: 402 Swetland Building

Look to CENTURY for

Correctly Protected Electric Motors for Hazardous Conditions

SPLASHING LIQUIDS FALLING SOLIDS

Plant wash down — below work line protection against falling chips — splashing cutting oil. You do not need an extra dog house to protect the motor.

Use Century Splash Proof Motors

ABNORMAL ATMOSPHERES ACID AND ALKALI FUMES ABRASIVE DUSTS

Air saturated with oil or animal fats — current conducting or corroding dust — organic and inorganic acids — aklalies, etc.

Use Century Totally Enclosed Fan Cooled Motors

GASOLINE AND GASES EXPLOSIVES

Protection against atmospheres containing explosive quantities of gasoline, petroleum naphtha, alcohols, acetone, lacquer solvent vapors, and natural gases (Class 1, Group D) or explosive grain dust (Class 2, Group G)

Use Century Explosion Proof Motors

★ Century Motors are built in such a wide variety of kinds, types, and sizes up to 400 horsepower that it is an easy matter to select and properly apply the *right* motor for every job regardless of load and operating conditions. 245

If you are engaged in war work of any kind, get the facts on Century protected motors by calling in a Century Motor Specialist — there's one near you.

Century MOTORS

CENTURY ELECTRIC COMPANY
1806 Pine Street St. Louis, Missouri
Offices and Stock Points in Principal Cities

ONE OF THE LARGEST EXCLUSIVE MOTOR AND GENERATOR MANUFACTURERS IN THE WORLD

. . . AND THEN THEY CALLED IN

THE MAN FROM CARNEGIE - ILLINOIS

A bedspring manufacturer faces the job of producing machine gun clips. A staybolt maker converts his entire production to machine gun barrels. Armor piercing bullets in an endless stream are produced by a gear maker. Heavy caliber shells roll swiftly from a factory that formerly made linoleum rugs.

PICTURE what's been happening to the men in these plants. For them, this swing-over from peacetime manufacture to all-out war production has been one long succession of headaches. In most cases they have had to start from scratch to learn how to turn out, in huge quantities and quickly, a product entirely new and unfamiliar. Often they have had to master equally unfamiliar processes of manufacture.

Even when the tough problems of equipment and personnel had been solved, other questions just as important still remained to plague them: What steel to use? How to get the high physicals demanded? How to meet the exacting standards required? . . . It was then they wisely called in the man from Carnegie-Illinois.

In one plant after another, our steel metallurgists have been able to lend a helping hand. Drawing on their wide experience in the latest fabricating techniques, they have shown how to speed up forging, to save time in welding, to reduce machining schedules. Again and again their suggestions have lead to important modifications in manufacturing methods that have worked wonders in obtaining highly desirable physical properties formerly thought impossible.

This practical advice and cooperation are available to every user of Carnegie-Illinois steels and to every manufacturer of war materials.

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

USS

NEED THE STRONGEST?

Then Try Mac-it Square Head Alloy Steel Set Screws!

You'll find the "pioneer" of the Mac-it line offers amazing resistance to mushrooming of the point and breakage under the head. Mac-it square heads are used on the toughest *holding-down* jobs—such as bearings of forming machines, giant axle housings, road machinery, textile machines, locomotives, and coal cutting machines.

Mac-its are milled from the bar, and heat-treated for maximum strength. Specify Mac-it Square Head Alloy Steel Set Screws when you need the strongest.

For information on the only complete line of alloy screws, write for Catalog 40.

THE STRONG, CARLISLE & HAMMOND COMPANY
1392 West Third St., Cleveland · Ohio

THE DISTRIBUTOR

is the

SUPPLY LINES FROM THE MANUFACTURING SUPPLIER

FOCAL POINT

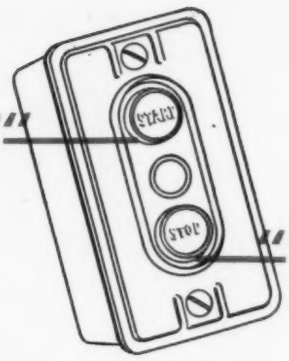
SUPPLY LINES TO THE MANUFACTURING CONSUMER

OF INDUSTRIAL MARKETING

ALLEN

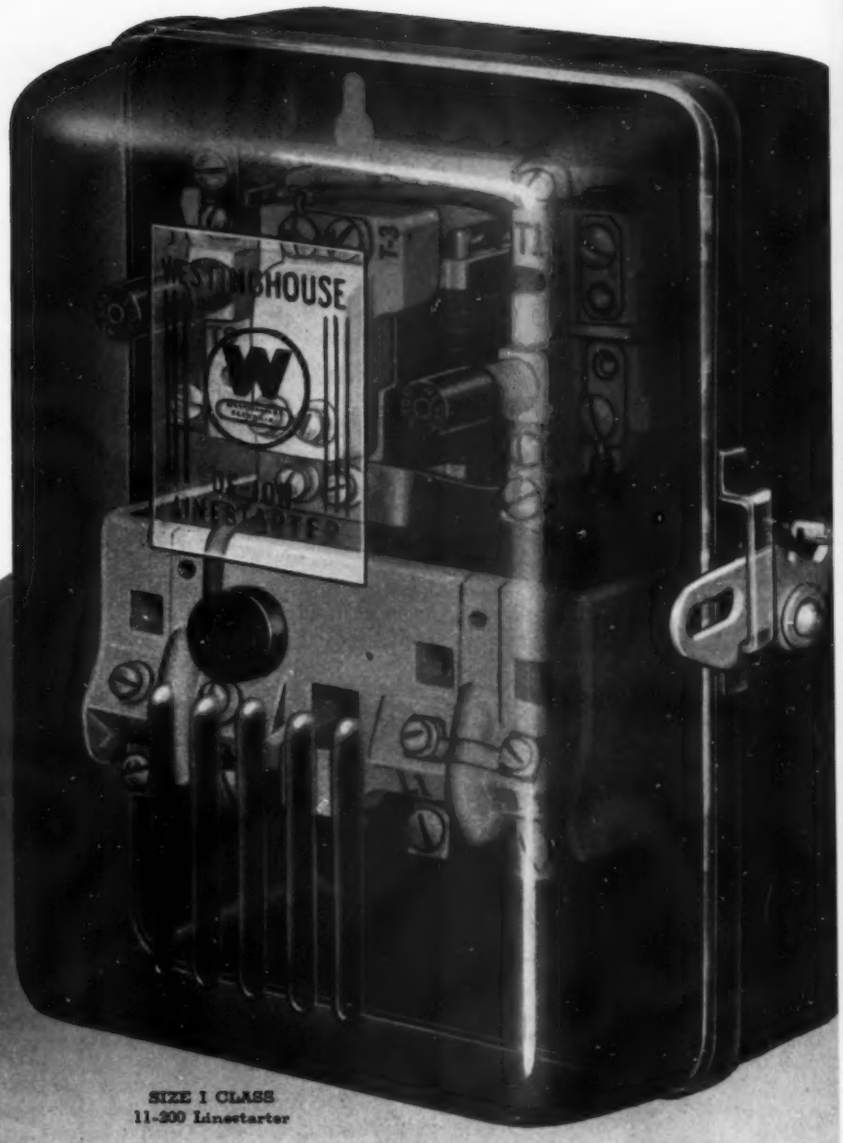
gratefully acknowledges the dependence of modern industry on a strong body of Distributors, serving as the sales agents of the manufacturer and the procurement agents of the consumer. Only through such an institution can supply and demand be adjusted to the *known needs* of producers — as only the local Distributor knows them.

THE ALLEN MANUFACTURING COMPANY, Hartford, Connecticut, U. S. A.



but no "maybe"

WITH WESTINGHOUSE "De-ion" LINESTARTERS



SIZE 1 CLASS
11-200 Linestarter

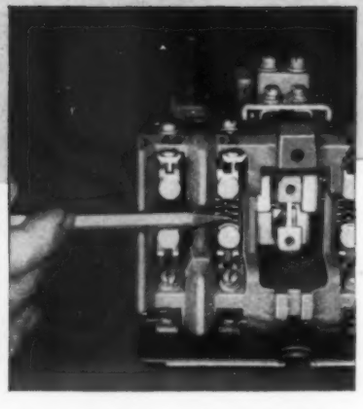
There's no "maybe" about the operation of the Westinghouse "De-ion" Linestarter. Simple, direct, vertical operation with just ONE moving part insures that the motor it controls will definitely "start" or "stop" without question or hesitation. Freedom from bearings and complicated linkages insures positive action. Vertical operation, as well, prevents the possibility of shocks causing accidental closing of the starter.

This basic feature, together with exclusive "De-ion" arc quenching protection for contacts, explains why Westinghouse Linestarters offer better protection against production interruptions on important circuits. Accurate, unvarying Bi-metal overload protection means further assurance for vital drives. Get these advantages today—check your nearest Westinghouse Agent.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

J-21185-A

VERTICAL OPERATION . . . JUST ONE MOVING PART . . . The armature and contact crossbar are a single unit that moves vertically.



"DE-ION" ARC QUENCHER PROLONGS CONTACT LIFE . . . When contacts open, arc is drawn into "De-ion" grids and instantly extinguished.

Westinghouse

YOU CAN'T DROWN FLAMENOL WIRE

REG. U. S. PAT. OFF.

Water, Oils, Coolants, Inks, Mild Acids

IT RESISTS THEM ALL!

CONTINUOUSLY under water for six months, this valve and its standard Flamenol wire leads were entirely serviceable when they emerged—just as good as when they were submerged. During the test, current was turned on and off continuously.

This is one of 25 tests by Alco Valve Company, St Louis, Mo., which proved that Flamenol wire meets the toughest machine-operating conditions.

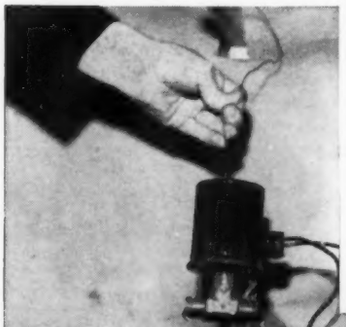
FLAMENOL WIRE

—will not support flame.

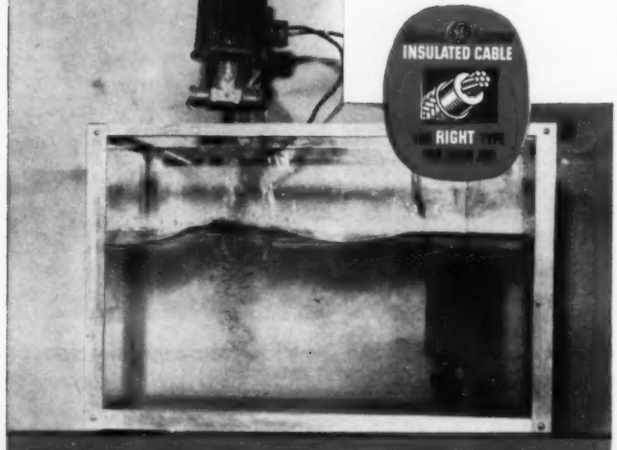
—is unharmed by splashing oil, inks, coolants, and other liquids.

—offers high resistance to abrasion.

—is flexible. Wound on 1½ times its diameter, it shows no cracking after subjection to aging and to sustained heat or cold (60 C and minus 10 C, respectively).



For further data—sizes, colors, prices—consult our local office. *General Electric Company, Schenectady, N. Y.*



GENERAL ELECTRIC

OHIO

COMPACT

STREAMLINED

INTEGRAL MOTORS

Frame 8" diameter x 10⅜" long.

Type P—2 or 3 Phase, 60 cycle.

Voltages—110, 220, 440 and 550.

Squirrel Cage Rotor, dynamically balanced.

Normal torque; Constant speed; Ball bearings; Fully enclosed; Plain barrel frame or rigid base for Floor, Sidewall or Ceiling mounting.

Sizes—½ - ¾ and 1 HP at 850 RPM
¾ - 1 and 1½ HP at 1150 RPM
1 - 1½ and 2 HP at 1750 RPM
1 - 1½ and 2 HP at 3500 RPM

Same sizes 50 cycle at 5/6 of above speeds. Odd voltages and cycles available. Shaft length and lead outlet to suit. A quiet running motor with minimum vibration.

OHIO MOTORS INCLUDE

- Split-Phase Induction to 1/3 HP
- Direct Current to ¾ HP
- Permanent Split Capacitor to ¾ HP
- Capacitor Start to 1 HP
- Capacitor Start and Run to 1 HP
- Polyphase to 2 HP
- Shell Types to 5 HP
- Torque to 100 oz. ft.
- Shaded Pole to 1/30 HP
- Synchronous to 1/6 HP
- A.C. to D. C. Motor Generators and High to Low Voltages D. C. Dynamotors up to 300 watts.

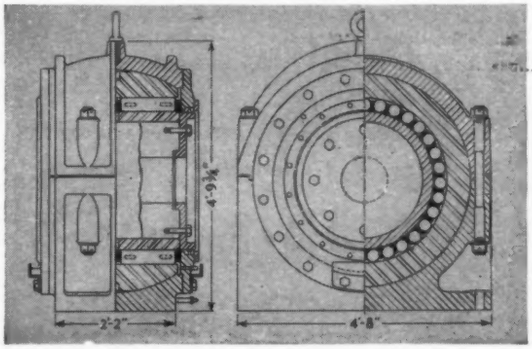
What is your problem?

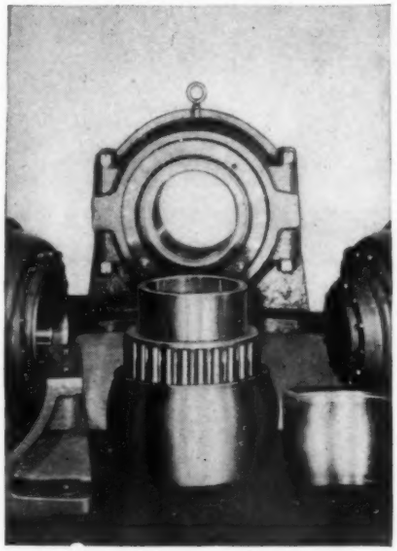
THE OHIO ELECTRIC MFG. CO.

5914 Maurice Ave. Cleveland, Ohio

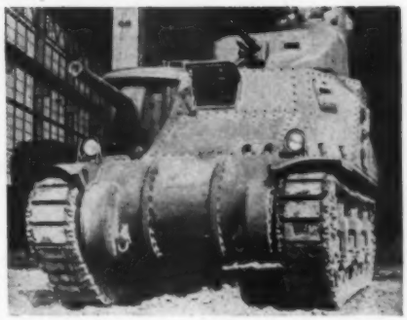
IN THE NEWS
WITH BANTAM BEARINGS

ENGINEERING ADVANCEMENT for new Chicago project is the use of radial roller bearings in the bascule type bridge now under construction for North State Street. The bridge, a perspective study of which is shown above, will rank among the largest of its kind in the world, with a width of 108 feet and a clear span of 210 feet. Two 36-foot roadways will be provided. Shown at left is cross-section of one of the large (47½" O.D.) Self-Aligning Roller Bearings, designed and built by Bantam, which will support two sets of three trunnions which in turn will carry the two movable leaves weighing 8,500,000 lbs. each. Self-aligning features, provided by spherical outer races resting in spherical housing seats, will compensate for any possible load deflections that may take place—another example of Bantam's engineering skill in designing anti-friction bearings for new and unusual requirements. Furthermore...



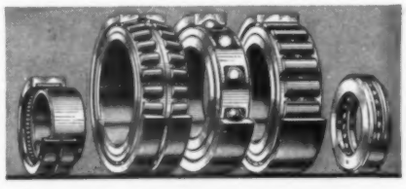


Substantial savings in size of electrical equipment and in power operating costs will be made through the use of Bantam Radial Roller Bearings. Only four 75 HP series motors will be required to operate the bridge, while the lower servicing and maintenance requirements of these bearings will bring additional savings. Bantam Bearings, such as those shown at left, have already been applied with gratifying results in other types of bridges. Breakaway and running loads have been reduced, and spans are moved with greater ease.



"BIG BRUISER" is this M-3 28-ton tank shown leaving the assembly line of the Chrysler Tank Arsenal. In the transmission, Bantam's Quill Roller Bearings aid in passing the tremendous driving power from motor to tractor treads. Maintaining a prompt, efficient flow of bearings of all types to the assembly lines of industry is Bantam's first job in helping meet the demands of the rapidly increasing production of defense material.

THE MANY ADVANTAGES of Bantam's compact, high capacity Quill Bearing are making it increasingly in demand for defense needs, where dependability and long-time maintenance-free service are primary considerations. A self-retained unit, easily installed and lubricated, it is ideally adapted to production line assembly methods. And its small size permits savings in materials of surrounding parts. For details on this unusual bearing, write for Bulletin D-104.



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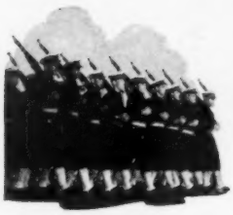

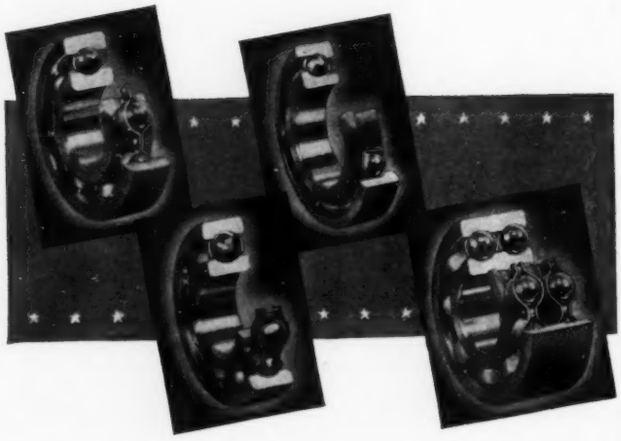

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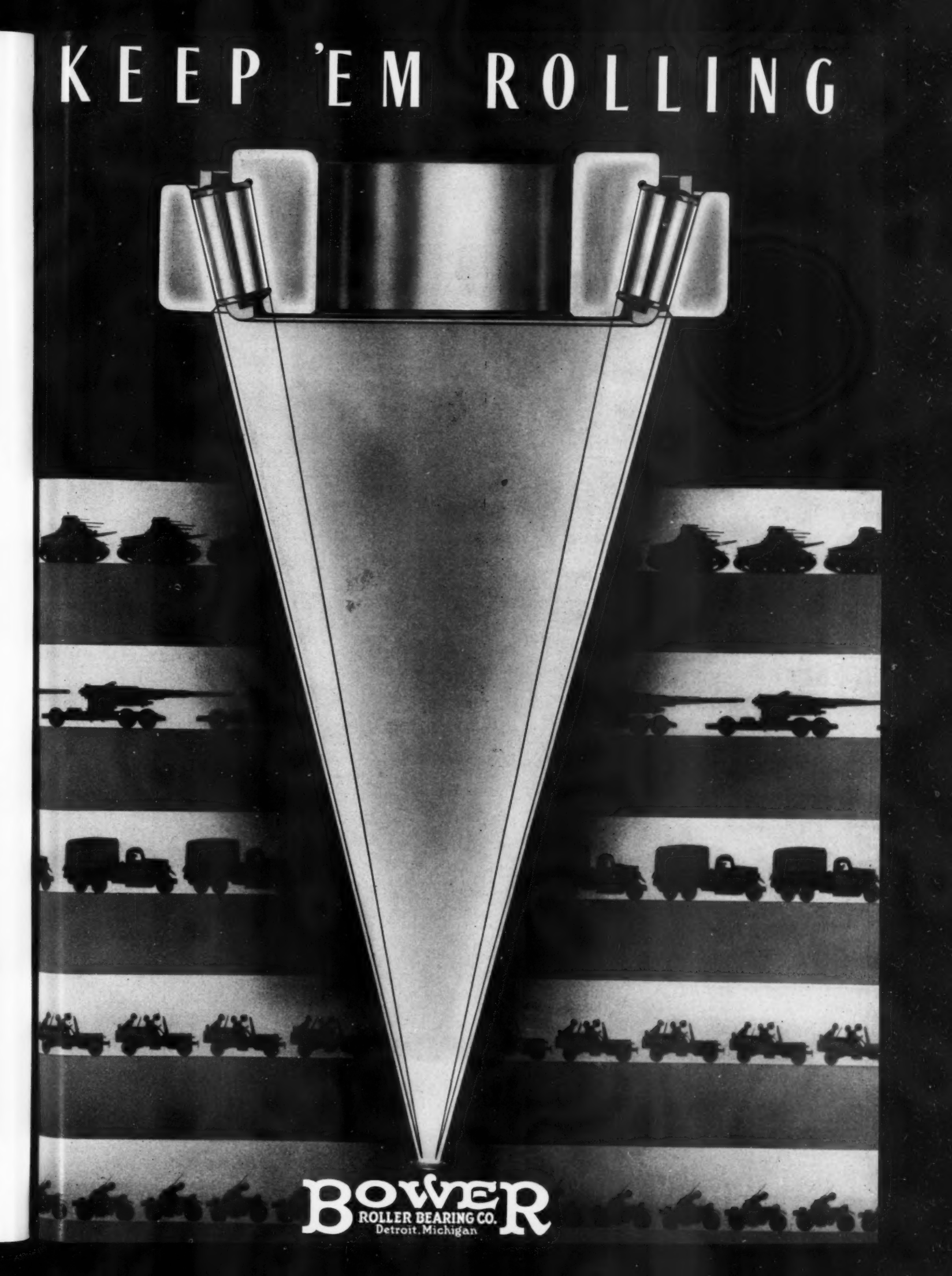
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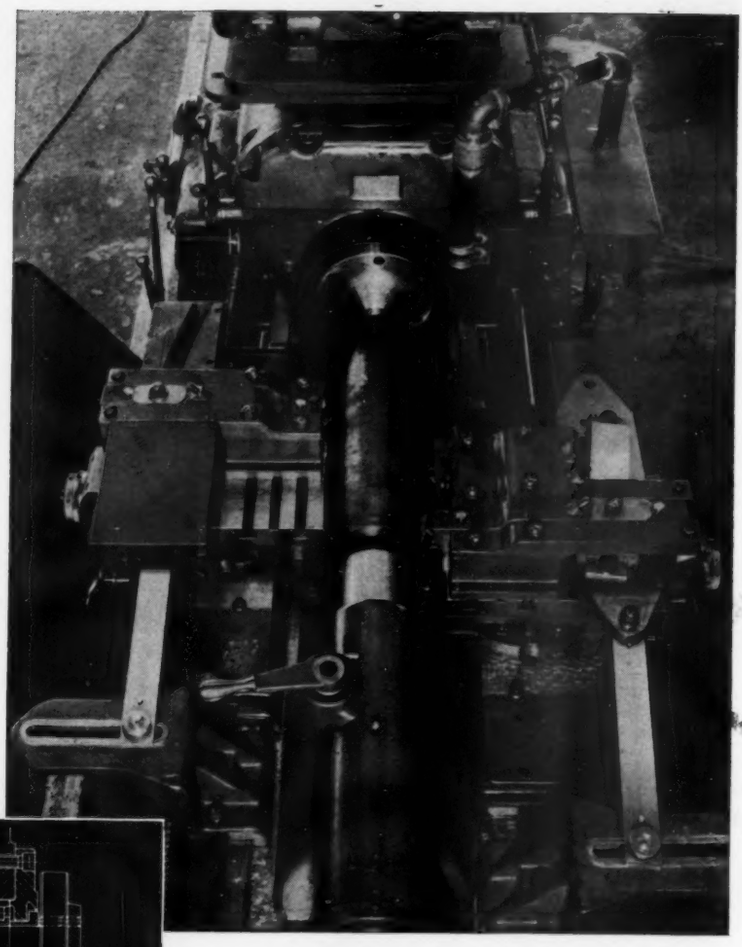

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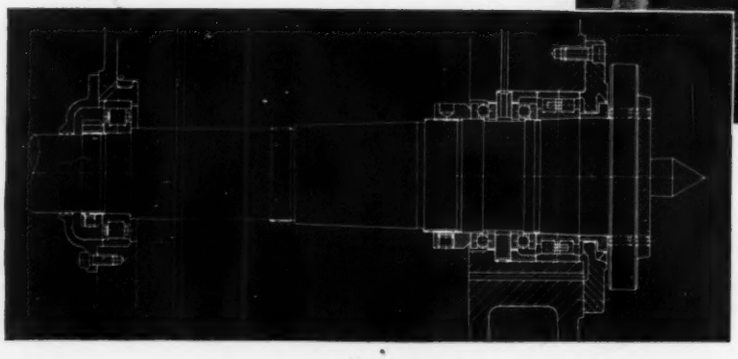

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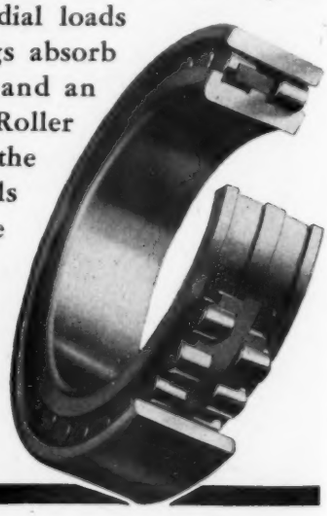

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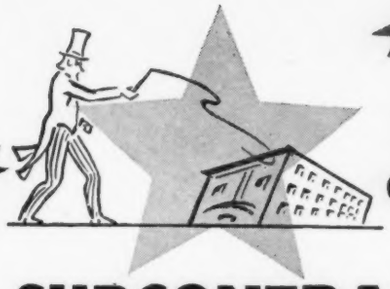

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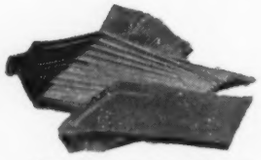

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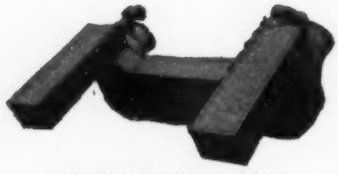

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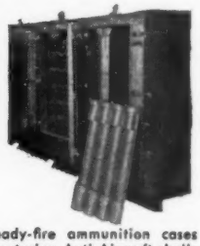

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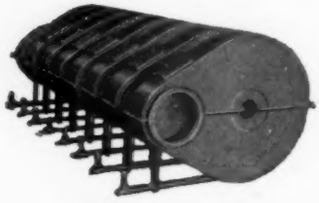

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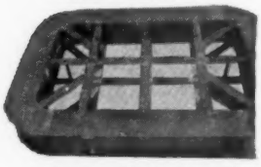

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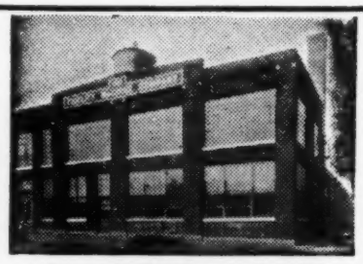

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Ace Hardware Mfg. Corp., 2014 E. Orleans St., Philadelphia, Pa. (Centerless)
Agerstrand Corp., Muskegon, Mich.
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Ajax Iron Works, Corry, Pa.
American Shearer Mfg. Co., Nashua, N. H. (Also polishing & buffing)
Bergram Mechanical Engin. Co., Inc., New Britain, Conn.
Central Machine Works, Worcester, Mass.
Challenge Machinery Co., Grand Haven, Mich.
Cincinnati Ice Pick & Tong Mfg. Co., 118 Burrows St., Cincinnati, O.
Columbus Brass Mfg. Co., 620 Dublin Ave., Columbus, O.
Columbus Die, Tool & Mach. Co., Columbus, O.
Commercial Centerless Grinding Co., 6603 Cedar Ave., Cleveland, O. (Centerless)
Eastern Centerless Grinding Co., 624 Capitol Ave., Hartford, Conn.
Gear Grinding Machine Co., Detroit, Mich.
Haida Engrg. Co., 34-11 Vernon Blvd., Long Island City, N. Y. (Cylindrical)
Hartford Machine Screw Corp., 476 Capitol Ave., Hartford, Conn.
Hartford Special Machy. Co., Hartford, Conn. (Gears, Threads, Cams)
Industrial Centerless Grinding Co., 14640 Schaefer Rd., Detroit, Mich.
Carlyle Johnson Machine Co., Manchester, Conn.
Kingston Products Corp., Kokomo, Ind.
Lempco Products Inc., Bedford, O.
Stephen J. Lewis Engrg. Co., 215 Butler St., Brooklyn, N. Y.
Machinists Tool Grinding Co., 2834 W. Lake St., Chicago, Ill.
Monrad Engineering Co., Portsmouth, O.
Moore Special Tool Co., Bridgeport, Conn.
Newman Bros., Inc., 666 W. 4th St., Cincinnati, O.
Phonograph Needle Mfg. Co., 42-46 Dudley St., Providence, R. I. (Pins & Needles)
Porter Machine Co., 3120 Forrer Ave., Cincinnati, O.
Precision Thread Grinding Co., 6651 Tireman Ave., Detroit, Mich.
South Shore Machine & Tool Works, Inc., Merrick Rd., Seaford, Long Island.
Standard Pressed Steel Co., Box 4, Jenkintown, Penna.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Taylor Machine Co., Cleveland, O.
Thomas & Skinner Steel Products Co., Indianapolis, Ind.
Wayne Mfg. Co., Honesdale, Pa. (Cylindrical)
Wiedemann Machine Co., Philadelphia, Penna.

HEAT-TREATING
Accurate Steel Treating Co., Chicago, Ill.
Acme Steel Treating Co., Detroit, Mich.
Agerstrand Corp., Muskegon, Mich.
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Air Reduction Sales Co., New York City
American Gas Furnace Co., Elizabeth, N. J.
American Metal Treatment Co., Elizabeth, N. J.
American Shearer Mfg. Co., Nashua, N. H.
Bellis Heat Treating Co., Branford, Conn.
The Bennett Metal Treating Co., Elmwood, Conn.
Challenge Machinery Co., Grand Haven, Mich.
Chapman Valve Mfg. Co., Indian Orchard, Mass.
Commonwealth Heat Treating Co., Detroit, Mich.
Cook Heat Treating Corp., Los Angeles, Cal.
Dayton Forging & Heat Treating Co., Dayton, O.
G. M. Diehl Machine Works, Inc., Wabash, Ind. (By electric salt bath equipment)
Ex-Cell-O Corp., Detroit, Mich.
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National Acme Co., Cleveland, O.
National Cylinder Gas Co., Chicago, Ill.
National-Erie Corp., Erie, Pa.
New England Metallurgical Corp., So. Boston, Mass.
Norfolk Hardening Works, Inc., Boston, Mass.
Ohio Heat Treating Co., Dayton, O.
Perfection Tool & Metal Heat Treating Co., Chicago, Ill.
Pittsburgh Commercial Heat Treating Co., Pittsburgh, Pa.
Porter Forge & Furnace, Inc., Everett, Mass.
Porter Steel Treating Co., George H., Cleveland, O.
Queen City Steel Treating Co., Cleveland, O.
Rickert-Schafer Co., Erie, Pa.
Rockwell Co., Stanley P., Hartford, Conn.
C. U. Scott & Son, Rock Island, Ill.
Fred A. Snow Co., Chicago, Ill.
Syracuse Heat Treating Co., 227 Solar St., Syracuse, N. Y.
Standard Gas Equipt. Corp., 18 E. 41st St., N. Y. C.
Standard Pressed Steel Co., Box 4, Jenkintown, Pa.
Strong, Carlisle & Hammond Co., Cleveland, O.
Surface Combustion Corp., Toledo, O.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Thomas & Skinner Steel Products Co., Indianapolis, Ind.
Thurner Heat Treating Co., Milwaukee, Wis.
U. S. Tool Co., Inc., Ampere, N. J.
Van Dorn Iron Wks., Cleveland, O.
Vincent Steel Process Co., Detroit, Mich.
Wesley Steel Treating Co., Milwaukee, Wis.
Wiedemann Machine Co., Philadelphia, Pa.
Robert Wooler, Philadelphia, Pa.

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Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Bayard & Co., M. L., Philadelphia, Pa.
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Challenge Machinery Co., Grand Haven, Mich.
General Machinery Corp., Hamilton, O.
Robt. Holmes & Bros., Danville, Ill.
Kirk & Blum Mfg. Co., 2823 Spring Grove Ave., Cincinnati, O.
George Koch Sons, Inc., Evansville, Ind.
Lakeside Bridge & Steel Co., Milwaukee, Wis.
Lewis Welding & Engineering Co., 881 Addison Rd., Cleveland, O.
Lukenweld, Inc., Coatesville, Penna.
Mahon Co., R. C., Detroit, Mich.
Products Machine Co., Bridgeport, Conn.
Steacy Schmidt Mfg. Co., York, Penna.
Swartzbaugh Mfg. Co., Toledo, O.
Trumbull Mfg. Company, Warren, O.

PATTERNS

Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Ajax Iron Works, Corry, Pa.
American Saw Mill Machinery Co., Hackettstown, N. J.
Catskill Metal Works, Catskill, N. Y.
Chas. F. Elmes Engrg. Works, Chicago, Ill.
General Pattern Works, 2231 Buck St., Cincinnati, O.
Littlestown Hardware & Foundry Co., Littlestown, Penna.
Products Machine Co., Bridgeport, Conn.
Standard Gas Equipt. Corp., 18 E. 41st St., N. Y. C.
Standard Pattern Co., 606-10 E. DeWald St., Fort Wayne, Ind.
Steacy Schmidt Mfg. Co., York, Penna.
Vilter Mfg. Co., 2130 S. First St., Milwaukee, Wis.

PLASTICS, Laminated & Molded

Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Auburn Button Works, Inc., Auburn, N. Y.
Boonton Molding Co., Boonton, N. J.
Chicago Molded Products Corp., 1020 N. Kolmar St., Chicago, Ill.
Consolidated Molded Products Corp., 1940 Thomas St., Scranton, Pa.
Continental Diamond Fibre Co., Newark, Del.
Erie Resistor Corp., Erie, Pa.
Eclipse Moulded Products Co., 5135 N. 32nd St., Milwaukee, Wis.
Formica Insulation Co., 4672 Spring Grove Ave., Cincinnati, O.
General Electric Co., I Plastics Ave., Pittsfield, Mass.
Firestone Tire & Rubber Co., Plastics Div., Akron, O.
Reynolds Spring Co., Plastics Div., Cambridge, O.
The Richardson Co., Lockland, Cincinnati, O.
Jos. Stokes Rubber Co., 322 Webster St., Trenton, N. J.
Universal Plastics Corp., 235 Jersey Ave., New Brunswick, N. J.
Waterbury Button Co., 39 River St., Waterbury, Conn.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Worcester Moulded Plastics Co., 9 Grafton St., Worcester, Mass.

PUNCHINGS

Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Ackler Stamping Co., Toledo, O.
Bethlehem Mfg. Co., Inc., Bethlehem, Penna.
Buddy "L" Co., East Moline, Ill.
Buffalo Toy & Tool Works, Buffalo, N. Y.
Challenge Machinery Co., Grand Haven, Mich.
Cleveland Metal Stamping Co., Cleveland, O.
Continental Diamond Fibre Co., Newark, Del. (Non-metallic)
Dayton Rogers Mfg. Co., Minneapolis, Minn.
Denning Mfg. Co., 1775 E. 87th St., Cleveland, O.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
H. Fishlove & Co., 712 N. Franklin St., Chicago, Ill.
Emil Hensle Mach. & Tool Works, 422 First St., Carlstadt, N. J.
H. K. Lorentzen, 395 West Broadway, N. Y. C.
M & M Mfg. Corp., Fortville, Ind.
Newman Bros., Inc., 666 W. 4th St., Cincinnati, O.
Robey Mfg. Co., East Lansing, Mich.
Swartzbaugh Mfg. Co., Toledo, O.
W. J. Savage & Co., Knoxville, Tenn.
W. K. Walthers Inc., 241 Erie St., Milwaukee, Wis. (Small)
Wayne Mfg. Co., Honesdale, Pa.

SCREW MACHINE PRODUCTS

Ace Hardware Mfg. Corp., 2014 E. Orleans St., Philadelphia, Pa.
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Algonquin Airports, Inc. (Hand)
Allied Engrg. & Equipt. Co., Indianapolis, Ind.
Ansonia Mfg. Co., 10 River Rd., Ansonia, Conn.
Automatic Screw Machine Prod. Co., 524 S. 2nd St., Milwaukee, Wisc.
B & B Specialty Co., Madeira, O.
Belding & Mull, Philipsburg, Pa.
Bicknell-Thomas Co., Greenfield, Mass.
Blake & Johnson Co., Waterville, Conn.
The Carlyle Johnson Machine Co., Manchester, Conn.
Chase Brass & Copper Co., 40 Roland St., Waterbury, Conn.
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Eastern Machine Screw Corp., New Haven, Conn.
The Greist Mfg. Co., 546 Blake St., New Haven, Conn.
Haida Engrg. Co., 34-11 Vernon Blvd., Long Island City, N. Y.
Hartford Machine Screw Corp., 476 Capitol Ave., Hartford, Conn.
A. H. Hyndman Co., 255 E. 95th St., Chicago, Ill.
Imsande Screw Products Co., 3517 Cardiff Ave., Oakley, Cincinnati, O.
Lempco Products Inc., Bedford, O.
Lombard Governor Co., Ashland, Mass.
McCullough Mfg. Co., 200 Old Colony Ave., South Boston, Mass.
Mid-West Screw Prod. Co., 20 St. George St., St. Louis, Mo.
Mueller Brass Co., Riggin & Charles Sts., Port Huron, Mich.
National Acme Co., Cleveland, O.
New Britain Machine Co., New Britain, Conn.
Newton Mfg. Co., Plainville, Conn.
Nicoud Mfg. Co., 1900 N. Kilbourne St., Chicago, Ill.
Olson Mfg. Co., 53 Commercial St., Worcester, Mass.
Wm. H. Ottenmiller Co., Pattison St., York, Pa.
The Peck Spring Co., Plainville, Conn.
Peco Mfg. Corp., Hope St. & Indiana Ave., Philadelphia, Pa.
Phonograph Needle Mfg. Co., 42-46 Dudley St., Providence, R. I.
Reliance Machine & Mfg. Co., 30 Irving Place, N. Y. C.
Robey Mfg. Co., East Lansing, Mich.
William Steinen Mfg. Co., 43 Bruen St., Newark, N. J.
Standard Pressed Steel Co., Box 4, Jenkintown, Penna.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Taylor Machine Co., Cleveland, O.
Transue & Williams Steel Forging Corp., Alliance, O.
Waltham Screw Co., Waltham, Mass.
Waltham Watch Co., Waltham, Mass.
W. K. Walthers Inc., 241 Erie St., Milwaukee, Wis. (Hand)
Ware Brothers, 4449 W. Lake St., Chicago, Ill.
Wayne Mfg. Co., Honesdale, Pa.

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Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Allied Engrg. & Equipt. Co., Indianapolis, Ind.
American Turboter Corp., New York City
Anchor Machine Works, 1521 N. Grand Ave., St. Louis, Mo.
Buffalo Toy & Tool Works, Buffalo, N. Y.
Challenge Machinery Co., Grand Haven, Mich.
The Cimatool Company, Dayton, O.
James Coulter Machine Co., Bridgeport, Conn.
Cross Gear & Machine Co., Detroit, Mich.
Dresser Mfg. Co., Bradford, Pa.
Earle Gear & Machine Co., 4707 Stenton Ave., Philadelphia, Pa.
General Machinery Corp., 2026 Branch St., Cincinnati, O.
Greist Mfg. Co., 546 Blake St., New Haven, Conn.
Hamilton Tool Co., Hamilton, O.
Hartford Special Machinery Co., Hartford, Conn.
R. Hoe & Co., Inc., East River & 138th St., New York City
Indian White Eagle Engin. & Mach. Works, Foot of 18th St., Brooklyn, N. Y.
Jenkins Machinery Co., Sheboygan Falls, Wis.
Kane & Roach Inc., Syracuse, N. Y.
Kent-Owens Machine Co., Toledo, O.
Lake Erie Engineering Corp., Buffalo, N. Y.
Stephen J. Lewis Engrg. Co., 215 Butler St., Brooklyn, N. Y.
W. K. Milholland Machinery Co., Indianapolis, Ind.
National Acme Co., Cleveland, O.
A. H. Nilson Machine Co., 1500 Railroad Ave., Bridgeport, Conn.
Pioneer Engineering & Mfg. Co., 31 Melbourne Ave., Detroit, Mich.
Pool Engin. Co., 514-518 Foresters Bldg., Mason City, Iowa.
Products Machine Co., Bridgeport, Conn.
St. John X-Ray Service, Inc., 30-20 Thomson Ave., Long Island City, N. Y.
Swartzbaugh Mfg. Co., Toledo, O.
Scully-Jones Co., Chicago, Ill.
Steacy Schmidt Mfg. Co., York, Penna.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Worcester Pressed Steel Co., Worcester, Mass.

SPECIAL MACHINERY
Ace Hardware Mfg. Corp., 2014 E. Orleans St., Philadelphia, Pa.
Ace Tool & Die Co., 2842 W. Grand Blvd., Detroit, Mich.
Ackerman Gould Corp., 92 Bleecker St., N. Y. C.
Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Allied Engrg. & Equipt. Co., Indianapolis, Ind.
American Machine & Foundry Co., Second Ave. & 56th St., Brooklyn, N. Y.
American Turboter Corp., New York City
Anchor Machine Works, 1521 N. Grand Ave., St. Louis, Mo.
Baldwin Southwark Div., Baldwin Locomotive Works, Philadelphia, Pa.
M. L. Bayard & Co., Philadelphia, Pa.
Bicknell-Thomas Co., Greenfield, Mass.
Bock Machine Co., 3618 Colerain Ave., Cincinnati, O.
Breckenridge Machine Co., Cleveland, O.
Buhr Machine Tool Co., 839 Greene St., Ann Arbor, Mich.
Builders Iron Foundry, 1108 Westminster St., Providence, R. I.
Carver Div., Murray Co., East Bridgewater, Mass.
Catskill Metal Works, Inc., Catskill, N. Y.
Central Machine Works, Worcester, Mass.
Challenge Machinery Co., Grand Haven, Mich.
Cimatool Co., Dayton, O.
Cincinnati Lathe & Tool Co., Cincinnati, O.
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Farrel-Birmingham Co., Inc., Ansonia, Conn.
Fidelity Machine Co., 3909 Frankford Ave., Philadelphia, Pa.
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General Machinery Corp., 2026 Branch St., Cincinnati, O.
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Hartford Special Machinery Co., Hartford, Conn.
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Howe Machinery Co., 30 Gregory Ave., Passaic, N. J.
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Lempco Products Inc., Bedford, O.
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Steacy Schmidt Mfg. Co., York, Penna.
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Aluminum Goods Mfg. Co., Manitowoc, Wis.
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G. & G. Mfg. Co., 2528 Spring Grove Avenue, Cincinnati, O.
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Gerding Brothers, Third and Vine Sts., Cincinnati.
Geuder, Paeschke & Frey Co., 1425 W. Paul St., Milwaukee, Wis.
Grand Haven Stamped Prod. Grand Haven, Mich.
The Greist Mfg. Co., 546 Blake St., New Haven, Conn.
H & H Tool & Mfg. Co., 308 East 3d Street, Cincinnati, O.
Haida Engrg. Co., 34-11 Vernon Blvd., Long Island City, N. Y.
Emil Hensle Mach. & Tool Works, 422 First St., Carlstadt, N. J.
Heyman Mfg. Co., Michigan Ave., Kenilworth, N. J.
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Kirk & Blum Mfg. Co., 2823 Spring Grove Ave., Cincinnati, O.
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Master Metal Products Inc., Buffalo, N. Y.
Metalcraft Mfg. Corp., H. K., New York City
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Palmer-Bee Co., Detroit, Mich.
Paramount Mfg. Co., Hillsdale, Mich.
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Powell Pressed Steel Co., Hubbard, O.
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Richmond Bros. Co., 173-177 Chestnut St., Newark, N. J. (Light & medium)
Robey Mfg. Co., East Lansing, Mich.
Scovill Mfg. Co., Waterbury, Conn.
J. H. Sessions & Son, 290 Riverside Ave., Bristol, Conn.
South Shore Machine & Tool Works, Inc., Merrick Rd., Seaford, L. I., New York.
Standard Gas Equipt. Corp., 18 E. 41st St., N. Y. C.
Standard Pressed Steel Co., Box 4, Jenkintown, Penna.
The Stanley Works, 195 Lake St., New Britain, Conn.
William Steinen Mfg. Co., 43 Bruen St., Newark, N. J.
Sundstrand Machine Tool Co., Rockford, Ill.
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Taylor-Shantz, Inc., Rochester, N. Y. (Light to medium)
Thomas & Skinner Steel Products Co., Indianapolis, Ind.
Transue & Williams Steel Forging Corp., Alliance, O.
U. S. Gas Range Corp., 213 E. 144th St., Brooklyn, N. Y.
Wayne Mfg. Co., Honesdale, Pa.
Whitehead Stamping Co., 1677 W. Lafayette Blvd., Detroit, Mich.
Worcester Pressed Steel Co., Worcester, Mass.
Wrought Washer Co., 2105 S. Bay St., Milwaukee, Wis.

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Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
Norris Bros., Inc., Robinson, Ill.
Phonograph Needle Mfg. Co., 42-46 Dudley St., Providence, R. I.
The Torrington Company, Torrington, Conn.

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Ace Tool & Die Co., 2842 W. Grand Blvd., Detroit, Mich.

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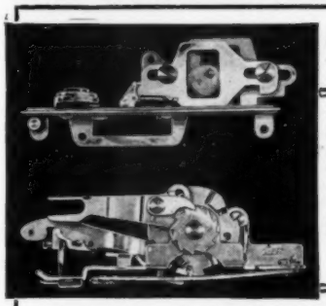

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Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
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American Turboter Corp., New York City
Anchor Machine Works, 1521 N. Grand Ave., St. Louis, Mo.
Argus Engineering Co., 1200 Park St., Hartford, Conn.
Bicknell-Thomas Co., Greenfield, Mass.
Bock Machine Co., 3618 Colerain Ave., Cincinnati.
Buffalo Toy & Tool Works, Buffalo, N. Y.
Buhr Machine Tool Co., 839 Greene St., Ann Arbor, Mich.
C. M. Tool & Die Co., Inc., 2823 W. Vienna Ave., Milwaukee, Wis.
Central Machine Works, Worcester, Mass.
Cimatool Co., Dayton, O.
Cincinnati Lathe & Tool Co., Cincinnati, O.
Cleveland Metal Stamping Co., Cleveland, O.
Cleveland Universal Jig Co., Cleveland, O. (Jigs and Fixtures)
Columbus Die, Tool & Machine Co., Columbus, O.
Denning Mfg. Co., 1775 E. 87th St., Cleveland
Doyle Machine & Tool Co., Syracuse, N. Y.
Eagle Precision Tool & Die Corp., L. I. C., N. Y.
G. & G. Mfg. Co., 2528 Spring Grove Ave., Cincinnati, O.
General Die & Tool Co., 2067 W. 55th St., Cleveland, O.
Grandahl Tool & Machine Co., 1200 Park St., Hartford, Conn.
The Greist Mfg. Co., 546 Blake St., New Haven, Conn.
H & H Tool & Mfg. Co., 308 East 3d St., Cincinnati, O.
Hamilton Tool Co., Hamilton, O.
Hartford Special Machinery Co., Hartford, Conn.
Emil Hensle Mach. & Tool Works, 422 First St., Carlstadt, N. J.
Heusen Mfg. Co., Chicago, Ill.
Indian White Eagle Engin. & Mach. Works, Foot of 18th St., Brooklyn, N. Y.
Interstate Designing & Machine Co., Philadelphia, Pa.
George Koch Sons, Inc., Evansville, Ind.
Lake Erie Engineering Corp., Buffalo, N. Y.
Lincoln Machine Co., Pawtucket, R. I.
Link Engineering & Mfg. Co., 1054 W. Baltimore Ave., Detroit, Mich.
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Oslund Tool & Die Co., 16 Gray St., Hartford, Conn.
Peters Tool Co., 114 E. Scott St., Milwaukee, Wis.
Pioneer Engineering & Mfg. Co., 31 Melbourne Ave., Detroit, Mich.
Pool Equipment Co., 514-518 Foresters Bldg., Mason City, Iowa.
Production Tool & Die Co., Springfield, Mass.
Quality Tool & Die Co., 401 Noble St., Indianapolis, Ind.
Charles E. Reed Co., 3227 Carroll Ave., Chicago (Jigs & fixtures)
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Robey Mfg. Co., East Lansing, Mich.
South Shore Machine Tool Works, Inc., Merrick Rd., Seaford, L. I., New York.
Stanek Tool & Mfg. Co., 2558 North 30th St., Milwaukee, Wis.
Standard Gas Equipt. Corp., 18 E. 41st St., N. Y. C.
William Steinen Mfg. Co., 43 Bruen St., Newark, N. J.
Stephen J. Lewis Engrg. Co., 215 Butler St., Brooklyn, N. Y.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Thomas & Skinner Steel Products Co., Indianapolis, Ind.
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Taft-Peirce Mfg. Co., Woonsocket, R. I.

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Cleveland Metal Stamping Co., Cleveland, O.
Dayton Rogers Mfg. Co., Minneapolis Minn.
H. Fishlove & Co., 712 No. Franklin St., Chicago, Ill.
H. K. Metalcraft Mfg. Co., 444 West 31st St., New York, N. Y.
Thomas Smith Co., 294 Grove St., Worcester, Mass.
Worcester Pressed Steel Co., Worcester, Mass.

WELDING

Aircraft & Arms Procurement Co., Chimes Bldg., Syracuse, N. Y.
American Tube Bending Co., Inc., 5 Lawrence St., New Haven, Conn.
Anchor Machine Works, 1521 N. Grand Ave., St. Louis, Mo.
M. L. Bayard & Co., Philadelphia, Pa.
The Bossert Co., Inc., 1860 Lenox Ave., Utica, N. Y.
Catskill Metal Works, Catskill, N. Y.
Challenge Machinery Co., Grand Haven, Mich.
Farrel-Birmingham Company, Inc., Ansonia, Conn.
Michael Flynn Mfg. Co., 2263 East Allegheny Ave., Philadelphia, Pa.
Frick Co., Waynesboro, Pa.
Robt. Holmes & Bros., Danville, Ill.
Gerding Brothers, Third and Vine Sts., Cincinnati
Kamis Engineering Co., 3d & Moore Streets, Philadelphia, Pa.
Lewis Welding & Engineering Co., 881 Addison Rd., Cleveland, O. (Heavy equipment)
H. K. Lorentzen, 395 West Broadway, N. Y. C.
Mahon Co., R. C., Detroit, Mich. (Plate work)
Master Metal Products Inc., Buffalo, N. Y.
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Peerless Welding Co., 335 W. 49th St., New York, N. Y.
Products Machine Co., Bridgeport, Conn.
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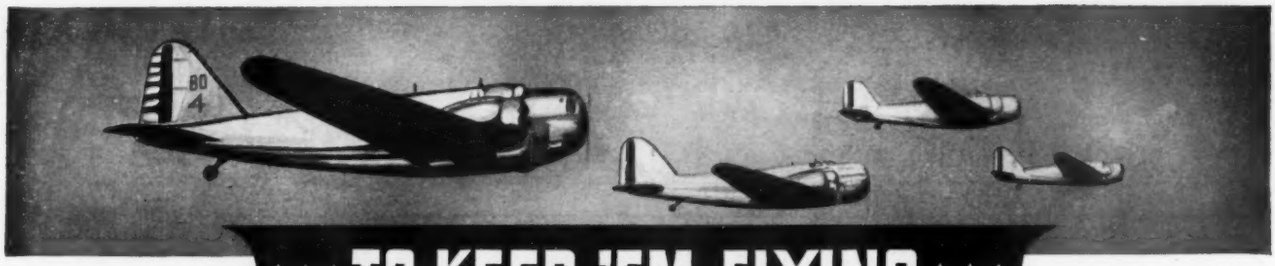

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KEEP 'EM RUNNING!

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If you want to know more about this method of increasing machine tool productivity, send today for a copy of the 58-page book, "The Simmons Way."

This is the job the Simmons Machine Tool Corporation performs for those who build the planes, ships, tanks and all of the other weapons with which America shall win this war. *Simmons keeps machine tools running!*

So great is the burden on the American Arsenal that *every* machine tool must run at its utmost productive speed. Therefore, major defense plants are sending their equipment to Simmons, who for thirty years has specialized in restoring machine tools to top-flight condition.

SIMMONS
ENGINEERED
Machine Tool
REBUILDING

SIMMONS MACHINE TOOL CORP.
1759 NORTH BROADWAY, ALBANY, NEW YORK
NEW YORK CITY OFFICE: 149 BROADWAY

NOW that we're in it, the American Metal Working Industries must use every available productive tool to help our armed forces win the ultimate VICTORY and to win it quickly.

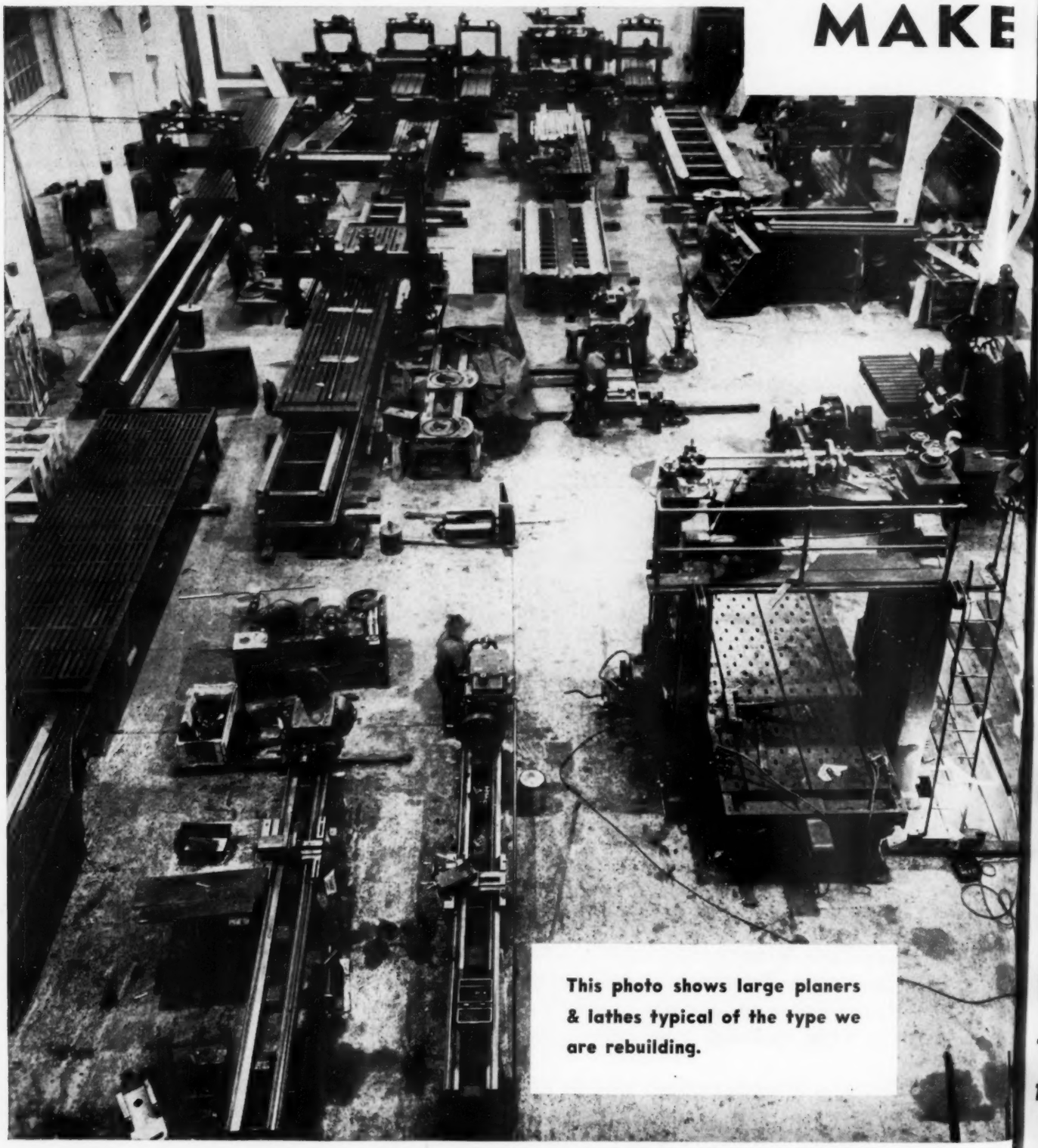
The greatest need is in big tools.—Large Planers—Large Boring Mills—Large Lathes—Large Millers—Large Gear Cutters.

While every Plant in the country building such new equipment is striving to do its utmost the time required for building large machine-tools is so extensive that additional and other manufacturing means must be provided to supply Heavy Duty Tools to plants engaged in war production.

There is available a number of Plants that have been specializing for years in rebuilding and modernizing old machine tools.

The Atlantic Machinery Corporation is rebuilding at present four Large Planers and will return these urgently needed machines to the war production line 8 to 10 months sooner than it would be possible to build new tools.

The Motto of today should be: DO NOT LET YOUR OLD MACHINES STAND IDLE WHILE YOU ARE WAITING FOR DELIVERY OF NEW MACHINES. HAVE THESE OLD MACHINES REBUILT AND MODERNIZED FOR TODAY'S TASKS BY COMPETENT MACHINE TOOL REBUILDERS.

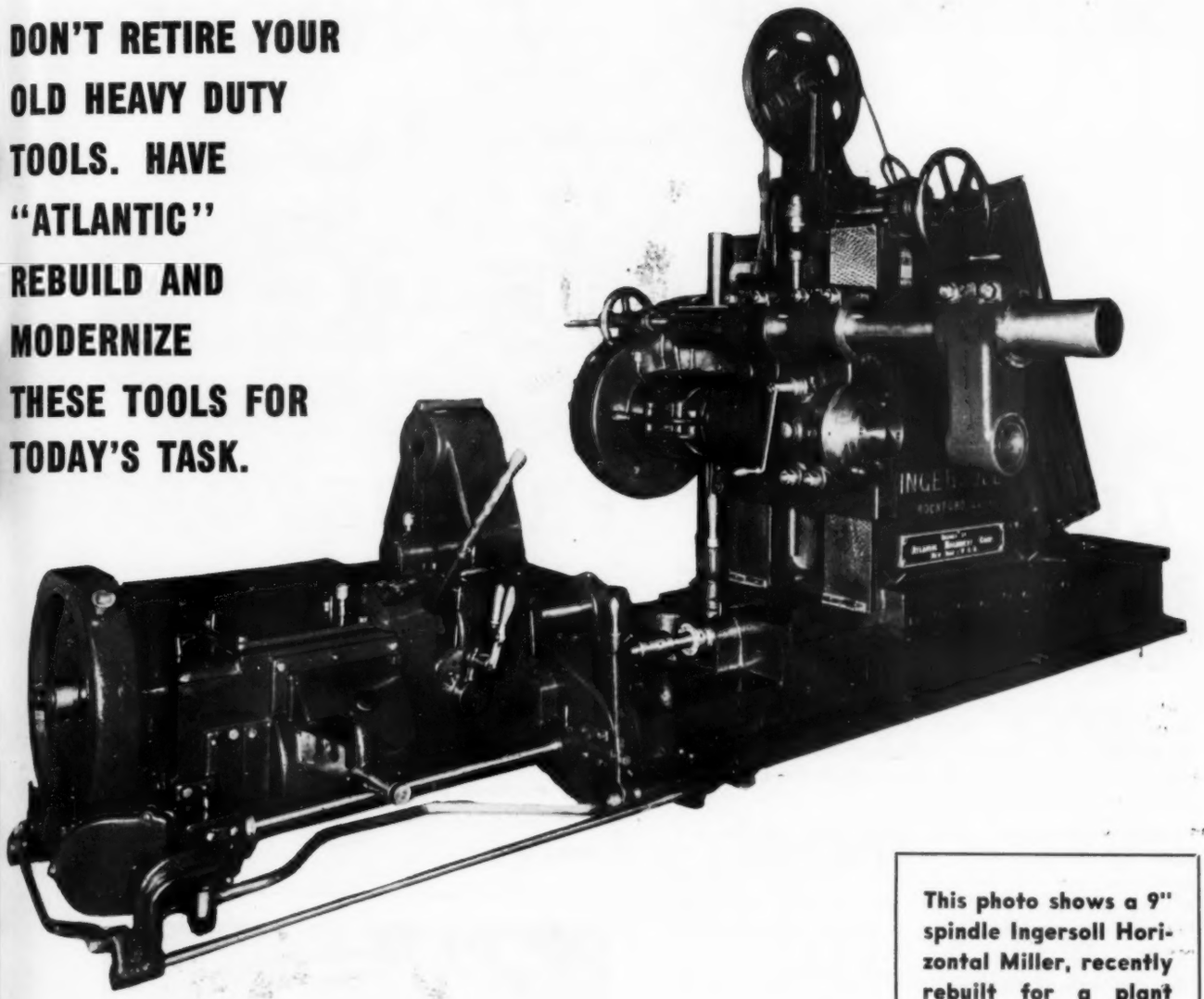


This photo shows large planers & lathes typical of the type we are rebuilding.

ATLANTIC MACHINERY C

EVERY MINUTE COUNT *NOW!*

DON'T RETIRE YOUR OLD HEAVY DUTY TOOLS. HAVE "ATLANTIC" REBUILD AND MODERNIZE THESE TOOLS FOR TODAY'S TASK.



This photo shows a 9" spindle Ingersoll Horizontal Miller, recently rebuilt for a plant building heavy tanks.

We have a number of Planers in stock —that can be modernized and rebuilt to your specifications.

Y CORPORATION

149 BROADWAY
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"LUCAS" OF BRIDGEPORT

Rebuilding—THE "LUCAS" WAY. . . .

This plant, its location and the modern facilities which it provides are the result of over thirty-five years experience in rebuilding machine tools for you and many other representative members of the great busy metal working industry.

Because you have helped us make these facilities possible through rebuilding your machine tools in the past, you now have the opportunity to take advantage of the improved and complete service which the "Lucas" organization and craftsmen are equipped to render.

The shortage of machine tools brought about by the stepped-up demands of National Defense can be greatly alleviated by putting idle machines back into service by rebuilding. Furthermore, machines now in use can be made more efficient and of greater value to production by restoring them to their original accuracy.

Rebuilding the "Lucas" way means a complete disassembling of machines, cleaning down to bare metal and then *completely rebuilding*. Brand new parts are used to replace those which should be replaced. All parts are carefully checked by precision instruments. After reassembly, the machine is run-in under power and again thoroughly checked before it is passed as meeting the "Lucas" high standards for precision, mechanical efficiency and required performance.

Rebuilding the "Lucas" Way is your assurance that the job has been well done and that the machine will render the utmost in service.

We are prepared to rebuild any of your machines and thereby help you meet the increased demands being made on you for turning out work at greater speed and to the closest tolerances. Our rebuilding experts are available to inspect your machines promptly and advise you on what is necessary to place them in condition for most useful service.

SPOTTING—This close up shows the beauty of this essential treatment of oil bearing surfaces.

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84" CINCINNATI PLANER

READY FOR IMMEDIATE DELIVERY

84" CINCINNATI Planer, 84" between housings; 60" under rails; 18' table. Arranged for motor drive, including motor. 60 cy., 3 ph., 220/440 volt. Machine can be inspected under power—Recently overhauled.

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MACHINERY MERCHANTS

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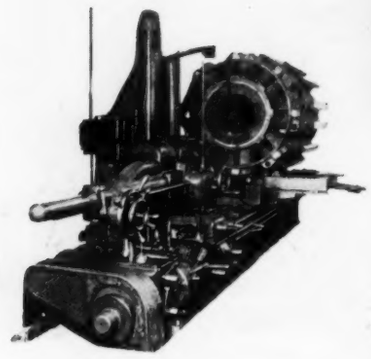
For ALL-OUT Production NOW

FALK spells because FALK means



HORIZ BORING MILLS

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#32 GIDDINGS & LEWIS, 3½"
GISHOLT 4" Bar Boring Bar; Knee Type, Motor Driven

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#22, WATERBURY, DSSD

TURRET LATHES

WARNER & SWASEY #2A Univ. Taper Attach., Chuck; Turret Tooling, M.D.
WARNER & SWASEY No. 1 GFH, PFT
WARNER & SWASEY No. 2A Chucking
WARNER & SWASEY No. 6, Bar and Chucking, GFH
ACME No. 4 GFH, PFT, Bar Feed
JONES & LAMSON 3"x36" Flat Turret Lathes (3)
J. & L. 2¼x24" Chucking
BARDONS & OLIVER #5 "Fox" Monitor Turret Lathe, swings 20", complete. Very fine condition.
2x24" J&L Turret Lathe; Chucking
ACME Hand Screw Machine, 1¼" cap.

MILLING MACHINES

#5 STARK Precision Plain Bench Miller mounted on Benches, arr. motor drive
#3 BURKE Bench Miller on pedestal
#6 WHITNEY Hand Miller
#4 HENDEY Lincoln Type Production Mill
#A GOOLEY & EDLUND 16", Briggs Type Mill
#6 JACKSON Vertical Mill & Die Sinker
#0 VAN NORMAN Mill, Duplex, with collets
#½ VAN NORMAN Mill, Duplex, Belt Dr.
#1½ CINCINNATI Plain Miller
#1½ BROWN & SHARPE Plain Miller
#1 GARVIN Hand Milling Machine
#3 BURKE Hand Milling Machine
42"x36"x12' CINCINNATI Planer

DOUBLE CRANK PRESS

#166 CONSOLIDATED, belt drive, with Marquette Cushions. 6" stroke.

PRESSES

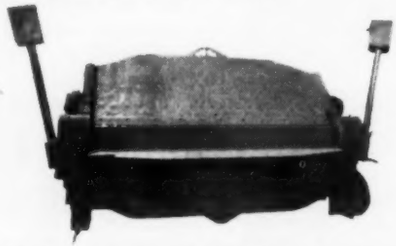
#4 BLISS, Back Flywheel, M.D.
#4½ BLISS, 3-column Forging Press with taper rolls
#16 BLISS, Horn Press, M.D.
#18 BLISS, O.B.I.
#19 BLISS, O.B.I. (3)
#19C BLISS, O.B.I.
#20 BLISS, O.B.I. (10)
#21½ BLISS, Geared OBI
#30 BLISS Arch.
#62 BLISS Reducing
#68N BLISS dble. act. with roll feed, arranged for geared motor dr.
#75½ BLISS Geared Trimming Press, S.S. Solid Frame, 4" stroke
#75 TOLEDO Plain
#75 TOLEDO Geared
#3 CONSOLIDATED
#4 STOLL Dble. Seamer
#14 STOLL
#2 AMERICAN OBI, Pl.
#3 AMERICAN CAN COMPANY, OBI
#3 ADRIANCE, OBI
#4 ADRIANCE, OBI
#24 ADRIANCE, Horn Press Plain Flywheel, 2½" stroke
#2 NIAGARA, OBI
#3 NIAGARA, OBI
#3 NIAGARA, Dble Seamer
#4 NIAGARA Dble Seamer
#6 NIAGARA OBI
#25 NIAGARA Arch.
#3R MARQUETTE, Geared, M.D.
#50 PERKINS, Dble Crank, Plain
#4 BAXENDALE (3) OBI
#6 WATERBURY Open Back Plain
#93D TOLEDO, S.S. Dble Cr. Bed 54 x 42, 4" str., 100 tons
#25 STOLL Horn Press
#103S BLISS Automatic Gang Press
25 TON HENRY & WRIGHT
GENERAL Flexible Press
#75½ BLISS Geared Trimming Press

BRAKES

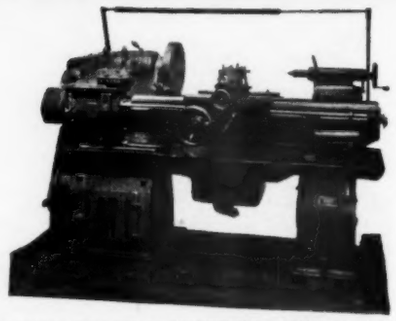
DREIS & KRUMP Hand Brake, 8' x 14 ga.; 8'x18 ga. (2)

KEYSEATERS

#3 BAKER BROS., takes 72"x3" wide



10 ft. ½ cap.—motor driven 3 phase 60 cyc. 220/440 V. Machine pictured above.



13X30 PRATT & WHITNEY MODEL "B" Gauge Makers Lathe

Motor in Base. Taper attach. Specially adapted for making Thread and Plug Gauges or other extremely accurate turning.

SHEARS

STOLL 6'x18 ga., Gap Shear #172
NIAGARA Foot Shear, 36", 30" (3)
#216D NIAGARA Circle Shear, Motor Driven
#142 NIAGARA Sq. Shear, 42"x16 ga.
#748 NIAGARA Power Squaring Shear, 3/16 x 4'

GREENFIELD #12 Hydromatic INTERNAL GRINDER: Swings 15"; Grinds 5" diam. 4" deep. Condition equal to new. Direct motor drive, 3/60/220.

NEW MACHINERY

REPRESENTATIVES FOR
DREIS AND KRUMP
"CHICAGO" PRESS BRAKES
BUFFALO FORGE DRILLS

LATHES

27"x20' LODGE & SHIPLEY, Patent Head
26"x16' GREAVES KLUSMAN, Pl. Change with Raising Blocks to swing 48"
26"x12' CRAWFORD ERIE Heavy Duty Lathe, quick change gear
25"x12' LEBLOND Heavy Duty, Taper Attach.
20x8' AMERICAN, QCG, Motor Drive
20x10 DAVIS, QCG, cone drive
21"x8' LEBLOND, turret on carriage
18"x12' HAMILTON, cone
19"x8' LEBLOND Production, QCG
18"x8' CHARD cone
16"x6' LODGE & SHIPLEY Geared Head
16x6' AMERICAN Geared Head
16x6' PRATT & WHITNEY cone
13x6' PRATT & WHITNEY Model "B" gagemaker

Every Item Guaranteed

FALK

Partial Listings Only

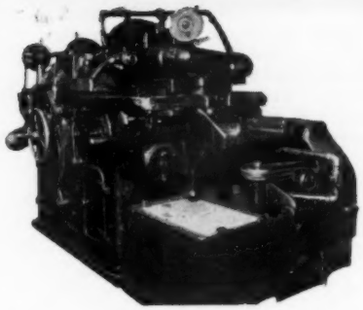
MACHINERY

MACHINERY

18 WARD STREET

With ECONOMY and SPEED!

PRODUCTION!
MACHINE DELIVERIES



10 x 36 Landis Plain Grinder Self contained. Complete with Chuck, Back Rests and Centers.

GRINDERS

#2 CINCINNATI, Universal
#14 BROWN & SHARPE 10x48", Plain
#2 LANDIS 10x36" Plain, self contained
#2 CINCINNATI Plain 12x36, M.D.
14"x50" NORTON Plain, Model "A"
#1 NORTON Universal Tool & Cutter
#8 GARDNER 40" Disc & Ring Wheel
BRYANT #15A Internal & Face
GREENFIELD #12 Hydrol Internal Grinder
#2 NORTON Tool and Cutter Grinder, 10x32"

SHAPERS

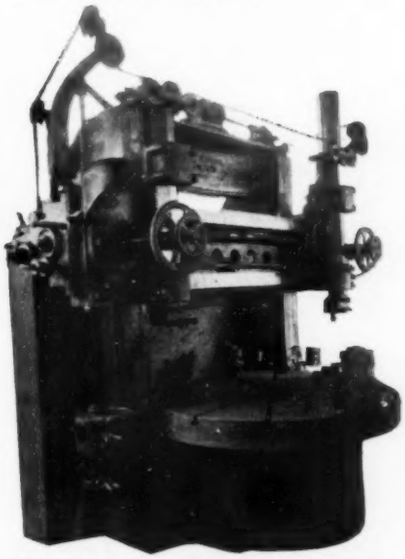
28" GOULD & EBERHARDT "Invincible"
26" SMITH & MILLS, cone
25" CINCINNATI, cone
24" GOULD & EBERHARDT Gear Box Dar.
24" GOULD & EBERHARDT, cone
24" CINCINNATI, cone
26" SMITH & MILLS, cone
24" STOCKBRIDGE, cone
24" HENDEY, Friction Drive
20" CINCINNATI, cone
20" OHIO
20" HENDEY, Friction Dr.
17" SMITH & MILLS, Cone (2)
17" SMITH & MILLS, Bevel Gears
16" SMITH & MILLS, cone
16" STOCKBRIDGE, cone
14" GOULD & EBERHARDT Hi-Duty, cone
16" BEMENT Slotter
24"x20"x20" NPB Planer-Shaper, M.D.

DIE CASTING MACHINES

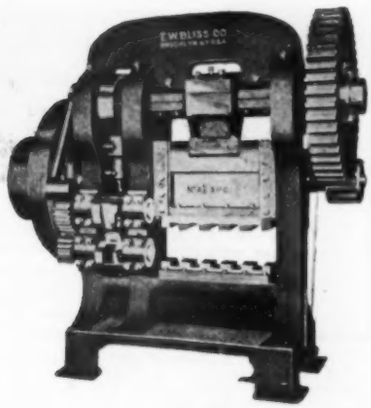
MADISON-KIPP Late Model, sizes 10x12, 12x14, 12x16

MISCELLANEOUS

16 PENN Riveters, motor driven. (2)
HUNTER Cut-Off Saw
#5 MOLINE Hole Hog, six spindles
LASSITER-MILLHOLLAND Geared Head Staybolt Machine
GROB Band Filing Machine
9x9 TOLEDO Power Back Saw
GLOBE Octagon Tumbling Barrel



62 Niles Boring Mill Air Motor drive with motor 3 phase 60 cyc. 220/440 V. Machine pictured above.



"BLISS" THREE-COLUMN FORGING PRESS, No. 4 With Positive Clutch Code Word, Realishad

This press as shown, has machine steel upper and lower die holders, and a crank on end of main shaft operates two sector gears attached to rocking die holders for rolling tapers on claw hammers and other similar work. Axes—spring leafs, etc.

Carried in stock.

INDEX MILLING MACHINES
LARGE STOCK OF RE-BUILT MOTORS AND GENERATORS
A.C. D.C.

14" BULLARD MULTAU-MATIC

14" dia., 6 station, fitted with Cushman Chucks: Rebuilt. Motor driven.
1—16" Bullard Multau-Matic, 8 stations.

MACHINISTS BENCH VISES

ALL SIZES—PLAIN and SWIVEL

DRILL PRESSES

AVEY 2-spdle, 12" overhang, M.D.
AVEY 4-spdle, BB, High Speed, #2 M.T.
AVEY 6-spdle, BB, High Speed, #2 M.T., 7⅛" overhang
AVEY 1-spdle, #1½, High Speed, BB, 8¼" overhang
AVEY 3-spdle, High Speed, BB, 7⅛" overhang #2 MT
HENRY & WRIGHT 2-spdle, #2 MT, 7" overhang PL bear
HENRY & WRIGHT 1-spdle, #2 MT, 12" overhang, BB
MOLINE Rail Drill #3, 4-tee slot table, Arr. M.D.
ALLEN 2-spdle Drill, #2 MT, 7" overhang, 10" centers
LANGELIER #2 Drill, 1-spdle, 5" overhang
NATIONAL 4-spdle, #1 MT, Plain Bearing, fixed table
DAVIS 22", 1-spdle, back geared, #3 M.T., 11" overhang
LELAND GIFFORD 1-spdle, BB, #2 M.T., T&LPD
SIPP 1-spdle Drill, 8" overhang, #2 M.T.
BARNES 20" Upright Drill, Plain Head, #3 M.T.
LANGELIER 5-spdle, High Speed, 3¼" overhang
LELAND GIFFORD 4-spdle, BB, Sliding Head, #2 M.T.

AND ACCESSORIES

BUFFALO IRONWORKERS
SAWYER BENCH VISES
L&W LATHE AND MAGNETIC CHUCKS
L&W MAGNETIC CHUCKS
L&W MILLING MACHINE VISES
L&W DIVIDING HEADS

MADISON-KIPP DIE CASTING MACHS.

Late Model, high pressure; sizes, 10x12, 12x14, 12x16

GEAR HOBBERS

#3 BARBER COLMAN
#12 BARBER COLMAN
ADAMS #1, 12"
GOULD & EBERHARDT 48"
WHITON #2 Spur Gear Cutter

PAPER CUTTERS (Power)

42" ACME Power Paper Cutter, automatic clamp

Send Us Your Inquiries!

FALK

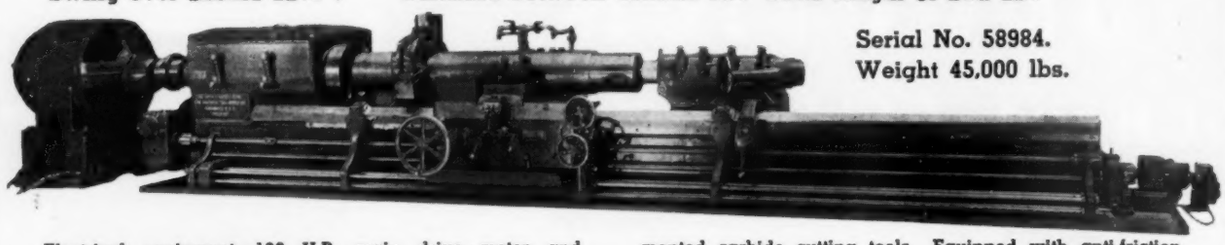
MERCHANTS

ROCHESTER, N.Y.

EASTERN *Rebuilt*

22" AMERICAN 100 H. P. INPUT SUPER LATHE

Swing over shears 22½". Distance between centers 16'. Total length of bed 22'.



Serial No. 58984.
Weight 45,000 lbs.

Electrical equipment—100 H.P. main drive motor and 4 other motors. All motors 230 volt, direct current.
140 Spindle speeds from 33 to 1200 RPM.
A super-powered, super-capacitated lathe, designed to obtain the maximum metal cutting capacities of cemented carbide cutting tools. Equipped with anti-friction bearings throughout, hardened and lapped helical gears in headstock, apron control, chip breaker, chip conveyor and many special features. Designed for extra heavy work, especially the turning of forgings.

AUTOMATICS
¾-½" Cleveland Model B, m.d. (2)
4 spindle ⅞" Cleveland Model M, m.d. (2)
¾" Model A Cleveland, belt
1¼-½" Cleveland Model B, belt
1¼" Hartford, belt
2½" Cleveland Model A, m.d.
6" Cleveland Model A, m.d.
No. 5A Potter & Johnston Automatics (7)
No. 6A Potter & Johnston (3)
No. 6D Potter & Johnston for brake drum work
Nos. 23, 24 New Britains, belt

ARBOR PRESSES
No. 24 Greenerd, m.d.
15 ton Lucas, belt
No. 3 Famco, bench type

BOLT THREADING MACHINES
9/16" Landis 2 spindle, m.d.
2 spindle 1" Acme, belt
3 spindle 1" Acme, belt
1" Landis, belt
1½" Landis 2 spindle, m.d.
1½" Landis belt, lead screw
2½" Acme, belt
American Bolt Heading Machine, belt, 1¼" cap.
No. 11S Rickert & Shafer Automatic Threading, 1" cap., m.d.

BORING MILLS
30" Colburn, 1 head, belt
48" Niles-Bement-Pond Car Wheel Borer, belt
51" Baush, m.d., 2 heads
7' Niles, 2 heads, friction feeds, old
No. 2 Barrett Cylinder Borer, 5" bar, belt
Niles-Bement-Pond Cylinder Borer, m.d., 12" main bar

BROACHING MACHINES
Cincinnati Mill Broach, m.d., brand new
No. 2 J. N. LaPointe, m.d., gear box
No. 2 LaPointe of Hudson, belt
No. 3B J. N. LaPointe, gear box, m.d.
No. 3 J. N. LaPointe Double, belt

CENTERING MACHINES
Hendey Single End, 14½" swing
Whiton Single End, 12" swing
Phoenix Single End

BALL BEARING DRILLS—SINGLE SPINDLE
Allen No. 2, belt
Henry & Wright Class B, No. 2, belt
Henry & Wright Class K, No. 2, belt
Leland & Gifford No. 2, belt

BALL BEARING DRILLS, MULTIPLE SPINDLE
2 spindle Edlund No. 3, m.d.
2 spindle Henry & Wright, No. 2, belt
2 spindle Leland & Gifford No. 2, belt
2 spindle Textile Horizontal, m.d.
3 spindle Avey, m.d.
3 spindle Cincinnati Pulley Machinery No. 2, belt
3 spindle Demco, power feed, No. 2
3 spindle Edlund No. 2, m.d.
3 spindle Henry & Wright Class K No. 2
4 spindle Allen Class B No. 2
4 spindle No. 2 Fosdick, power feed
4 spindle Gardam No. 1
4 spindle Henry & Wright Class B No. 2
4 spindle Henry & Wright Class K No. 2
4 spindle Kokomo No. 2
4 spindle Leland & Gifford No. 2 m.d.

MULTIPLE SPINDLE DRILLS
3 spindle 20 Barnes Gang
4 spindle No. 2 Coburn Mfg.
4 spindle No. 3 Foote-Burt
4 spindle No. 2 Foote-Burt Rail
4 spindle No. 4 Foote-Burt Rail
5 spindle 24" Barnes All Geared Self-Oiling
6 spindle 21" Hoefer
6 spindle National Acme Auto. Horizontal
6 spindle Niles
Nos. 00S, 1SS Garvin Horizontal Duplex
No. 1 Pratt & Whitney 2 spindle Gun Barrel
D2 Fox Straight Line
Nos. 2, 3 Baush
No. 5 Fox
Nos. 30, 37 Natco
No. 7D Moline 2 spindle Hole Hog
No. 15HC Fox
No. 18 Natco
No. 25 Baush Straight Line
No. 26C Fox Tapper
No. 51C Harrington
D31 Fox

RADIAL DRILLS
2½' Avey Sensitive
3' American Sensitive
3' Carlton Sensitive
3' Mueller Plain, Gear box
4' Hammond Jack Knife, m.d.
4' Hammond Jack Knife Wall Type
4', 5', 6' Niles-Bement-Pond Semi-Universal, var. speed m.d.
4', 5', 6' Niles-Bement-Pond Semi-Universal, gear box
4' Ryerson Plain, gear box
4' Prentice Plain, cone
5' Prentice Plain, cone
6' Dreses Plain, gear box
7' Dreses Plain, gear box
7' Fordick Plain, cone
No. 1 W. F. & John Barnes Horizontal

UPRIGHT DRILLS
15", 22", 26", 28" W. F. & John Barnes
20" Barnes All Geared Self-Oiling
20" Canedy-Otto, m.d.
20" Superior
21", 24", 32", 36" Aurora
21", 25" Weigel
22", 24" Barnes All Geared Self-Oiling
23" Snyder
24" Hoefer
24" Rockford
25" Superior
32", 36" Cincinnati Bickford
32", 40" Prentice
Nos. 2, 22 Colburn Mfg. Type
D2 Colburn H.D.
D3 Minster H.D.
Nos. 314, 315 Baker Bros. H.D.

GEAR MACHINERY
6", 18" Gleason Straight Bevel
No. 1-26" Whiton Full Universal
No. 3-26", 3-36", 3 Heavy, 4-36", 4-48", 6-60", 6-72" Brown & Sharpe Spur Gear Cutters
No. 3-26" Cincinnati Spur Gear Cutter
No. 5A Lees-Bradner Gear Generator
Gleason Bevel Gear Tester
Schuchardt & Schutte Gear Tooth Rounder
24" Cross Gear Tooth Rounder
20" Rochester Gear Tooth Rounder
Gleason Spiral Bevel Gear Rougher

INTERNAL GRINDERS
No. 6 Bryant Chucking, belt
No. 9 Cincinnati, Internal, s.p.d.
No. 12A Bryant, two motor drive
No. 80 Heald, 2 motor drive
No. 50 Heald Cylinder, hydraulic
Nos. 55, 60, 65 Heald Cylinder

CYLINDRICAL GRINDERS
6x18" Cincinnati Plain Hydraulic, m.d.
6x32" Norton Plain, m.d.
10x18" No. 14 Brown & Sharpe, belt
10x18" No. 14 Brown & Sharpe, m.d.
10x24" Landis, m.d.
10x30" Queen City, m.d.
10x36" Landis Integral Cam, m.d.
10x36" Norton, md. (6 in stock)
10x36" Norton, belt
10x50" Norton, m.d.
10x52" Landis, m.d.
12x18" Cincinnati-Plunge Cut, m.d.
12x36" Cincinnati, m.d.
12x36" Cincinnati, belt
12x36" Modern, m.d.
12x42" Landis, belt
12x48" Modern, m.d.
12x72" Cincinnati, 3 m.d., hydraulic
16x52" Landis, m.d.
18x72" Cincinnati Auto Parts Grinder, m.d.

DISC GRINDERS
No. 4 Besley, s.p.d.
No. 4 Gardner, s.p.d.
No. 6 Diamond, s.p.d.
No. 20 Gardner B.B. Combination Disc and Roll, m.d.
No. 120 Gardner Plain, s.p.d.
No. 120 Gardner Combination, s.p.d.

EMERY GRINDERS
30" Blount Wet, m.d.
Cadillac Polishing, m.d.
Hill-Curtis Polishing, belt
Hisey-Wolf 5 H.P., m.d.
Safety Emery Wheel Co., belt
Mitchell Eng. Co. Type A1 Polishing, m.d.
5 H.P. Northern, m.d.
Rockford Wet, belt
Springfield Wet, m.d.
U. S. Elec. Tool Co., m.d.

CENTERLESS GRINDER
Cincinnati Valve Seat Grinder, motor drive, 2 motors

SURFACE GRINDERS
No. 2 Fraser Lapper, belt
No. 3 Brown & Sharpe Planer Type Surface, belt
18x48" Diamond L.D. Face, m.d.
30"x84" Diamond H.D. Face, m.d.
54" Bridgeport Knife, belt
Covell-Hanchett Knife, m.d. No. 500 UK

TOOL & CUTTER GRINDERS
No. 1 Cincinnati, belt
No. 3 Brown & Sharpe, belt
Nos. 4, 5, 31 Oliver Motor Driven Drill Pointers
No. 23 Brown & Sharpe Gear Cutter Grinder, belt
Gisholt Universal, belt
Gleason Cutter, belt

THE EASTERN

1002 TENNESSEE AVE.

MACHINE TOOLS

Gould & Eberhardt Gear Cutter, belt
Landis Chaser, belt
Yankee Drill, belt

UNIVERSAL GRINDERS

12"48" Modern, belt
No. 4 Brown & Sharpe, belt

HAMMERS

Pettengell Bumping, belt
60 lb. Bradley Rubber Cushioned Helve, belt
80 lb. Bradley Rubber Cushioned Helve, belt
100 lb. Little Giant, belt
100 lb. Little Giant, m.d.
200 lb. Bradley Upright Strap, belt
250 lb. Little Giant, belt
350 lb. Niles Steam, new (3)
350 lb. Bement-Miles Steam
650 lb. American Eng. Wks. Steam
1500 lb. Morgan Single Frame Steam
2000 lb. Erie Double Frame Steam
2000 lb. Niles-Bement-Pond Single Frame Steam

KEYSEATERS

1" Morton, belt

GEARED HEAD ENGINE LATHES

16"x 7' Cisco, m.d.
22"x16' centers (22' bed) American 100 H.P. Super Lathe
24"x8'6" Bridgeford, m.d.
24"x18" Lodge & Shipley Patent Head, m.d., taper
26"x16' Bradford, m.d.
26"x16' Bridgeford, m.d., taper
27"x21'9" Bridgeford, m.d., taper

CONE HEAD ENGINE LATHES

11"x 5' South Bend
13"x 6' Willard
14"x 6' American
14"x 6' Bradford
15"x 6' Willard
16"x 6' Bradford
16"x 6' Pratt & Whitney
16"x 8' Bradford
16"x 8' Greaves-Klusman
16"x10' Bradford
18"x 6' Bradford
18"x 8' Bradford
18"x 8' Lodge & Shipley
18"x 8' Mueller, taper
18"x10' Bradford
18" raised to 28"x10' Reed
18"x10' Springfield
18"x12' Barker
18"x12' Monarch
18"x12' Schumacher-Boye
18"x14' LeBlond, taper
19"x 8' LeBlond, taper
19"x12' LeBlond, taper
20"x10' Davis
20"x10' Lodge & Shipley
20"x10' Pond
21"x 8' LeBlond, taper
21"x10' LeBlond, taper
21"x12' Bradford
21"x16' LeBlond, taper
22"x12' Greaves-Klusman
22"x13' Niles
22"x18' Niles, taper
24"x10' Bridgeford
24"x10' Canada
24"x10' LeBlond
24"x10' Whitcomb-Blaisdell, taper
24"x11' Chard
24-48"x16' McCabe 2 in 1
24"x16' Schumacher-Boye
30"x14' Hamilton, taper
30"x16' Schumacher-Boye
30"x20' Schumacher-Boye, taper

MANUFACTURING LATHES

3x80" LoSwing, m.d.
8x36" LoSwing, m.d.
8x60" LoSwing, m.d., hardened ways (2)
8x60" LoSwing, m.d., hardened ways, 2 carriages
12"x5' Sebastion, m.d.
16"x6' Rockford, cone
18"x8', Chard, cone
20"x8' American Turret, cone
20" raised to 28"x10' American Plain Turning, cone
30" American Pulley Turning, cone
11"x4' Wells Speed Lathe, cone
15"x6' Automatic Threading, cone
Niles-Bement-Pond Axle, cone
No. 5—42x96" Niles-Bement-Pond Center Driving Car Wheel Lathe, m.d., brand new
Niles-Bement-Pond Quartering Machine, m.d., new

MILLING MACHINES

No. 0 Steptoe Plain, cone
No. 2 Pratt & Whitney Hand, cone
Carter & Hakes Mfg., belt
No. 2 Garvin-Lincoln Type, belt
Gooley & Edlund Briggs Type A, belt
Putnam Briggs Type, belt
Newton C17 Vertical Slab, m.d.
11"x4' Hanson-Whitney, m.d.
30"x28"x8' Ingersoll Planer Type, m.d.
40" Ohio Tilted Rotary, m.d.
48" Oesterlein Tilted Offset, m.d.
C66A Newton 3 spindle Continuous, s.p.d.

MILLING MACHINE ATTACHMENTS

Vertical Attachment for No. 3 Cincinnati, cone
Vertical Attach. for Milwaukee Mfg. Type
Vertical Attach. for No. 1½ Cincinnati cone
Heavy Vertical attach. for No. 2 Cincinnati cone
Porter-Cable Vertical Attach.
12½" Brown & Sharpe Plain Dividing Head
No. 6 Brown & Sharpe Triple Index Centers
12" Cincinnati Gear Cutting Attach.
16" Cincinnati Gear Cutting Attach.
Slotting attachment for No. 2b Milwaukee
Universal attachment for No. 2A Brown & Sharpe
1¼" Cincinnati Rack Milling Attach. for No. 3 dial type
Kearney & Trecker Attachment for milling bridge reamers
Cincinnati Spiral Milling Attach. for No. 3 cone type
Kearney & Trecker Universal Attach. for No. 3B
Slotting Attach. for No. 3 Cincinnati, H.P.
Slotting Attach. for No. 2 Cincinnati cone
Universal Attach. for No. 3B Milwaukee

PIPE MACHINES

2" Landis Double Head Pipe & Nipple, cone
Red-E-Haul Portable, m.d., 2"
2" Bignall & Keeler, m.d.
2" No. 70 Jarecki, m.d.
2" Merrell, m.d.
4" Bignall & Keeler, m.d.
4" Eaton, Cole & Burnham, cone
8" Bignall & Keeler, cone
8" Landis, m.d.
12" Landis, m.d. (2 in stock)

PLANERS

24"x24"x12' Chandler, 2 heads, belt
36"x36"x10' Cincinnati, 3 heads, belt
36"x36"x10' Whitcomb-Blaisdell, 2 heads, belt
36"x36"x13' Niles-Bement-Pond, 1 rail, 1 side head belt
42"x42"x12' Niles-Bement-Pond, 2 heads, m.d., box table
42"x42"x18' Cincinnati, 2 heads, m.d.

PRESSES

McDonald Single Crank, 4" stroke
Waterbury-Farrel S.C. O.B. 1¾" stroke, weight 600 lbs.
Waterbury-Farrel D.C. O.B. 1½" stroke, wt. 1700 lbs.
No. 28 Consolidated O.B.I.
C2 Ferracute O.B.I.
D2 Ferracute Single Action Drawing
DD2 Ferracute Double Action Drawing
P2 Ferracute Stiles Type
No. 6 Waterbury-Farrel D.C.
S8C Ferracute D.C.
DG53 Ferracute Redrawing
No. 268¾B Toledo D.C. Toggle Drawing, 29" stroke, weight 175,000 lbs.
No. 496D Toledo D.C. Toggle Drawing, 17" stroke, weight 160,000 lbs.
30 ton Lourie Hydraulic
B33 Metalwood Hydro Pneumatic
No. 0 Springfield Straightening

PUNCHES & SHEARS

Buffalo Armor Plate Slitting size 101Wx20
Cleveland Model EF S.E.
No. 6 Long & Allstatter D.E.
No. 6 Long & Allstatter S.E.

RIVETERS

Nos. 2A, 2A H.D., 3A High Speed Hammer Co.
¼" Shuster
Hanna Air Riveter, 13" throat
Chicago Pneumatic 10x25x97
Hanna Bench Type Air, 8" throat

SAWS

No. 2B Cochran-Bly Cold Saw
No. 4 Cochran-Bly Cold Saw
No. 4B Cochran-Bly Cold Saw
6" Avey Milband Cutting-off Saw
6x6" Peerless Hack Saw, m.d.
6x6" Racine Hack Saw
10x10" Kelley Hack Saw, m.d., new (5 in stock)
8x8" Atkins Kwik-Kut Hack Saw, m.d.
8" Newton Cold Saw
Burr Cold Saw
Knowlton Cold Saw
20" Burke Cold Saw

TURRET LATHES AND SCREW MACHINES

No. 0 Brown & Sharpe Hand, cone
No. 4 Hardons & Oliver, cone
No. 4 Foster, cone
No. 6 Brown & Sharpe, cone
2¾" Acme Flat Turret, cone
2¼"x24" Jones & Lamson Steel Head Flat Turret, m.d., bar
2¼"x24" Jones & Lamson, bar feed, m.d., geared head (4)
3x36" Jones & Lamson Geared Head, chucking (4)
3x36" Jones & Lamson Geared Head, bar
3x36" Jones & Lamson 2 spindle Geared Head, chucking (6)
3¼x40" Greenlee Flat Turret, cone, bar
18" Acme Turret, cone
21" Gisholt Model H Tilted Turret (3)
24" Gisholt Model I Tilted Turret (3)

SHAPERS

16" Hendey Friction Type
24" Queen City Back Geared, cone
24" Smith & Mills Friction Type

CIRCLE SHEARS

Niagara 13" throat, belt, 16 ga.
Southwark Rotary, 36" throat, ⅜" cap. m.d.
No. 2 Southwark Rotary, 30" throat, ⅜" cap., m.d.
No. 34 Lennox Rotary Bevel, ¾" cap., belt
No. 258 2x14 Quickwork Rotary, 30" throat, ¼" cap., m.d.
Quickwork Circle, 30" throat, 16 ga.
Quickwork 20" throat, 18 ga., belt

SHEET METAL MACHINERY

7' Cast Iron Hand Brake, 18 ga.
McCabe Pneumatic Flanger, ¼" plate
Niles-Bement-Pond Flanger, 8'-⅛" cap.
10' Niles-Bement-Pond Flanger, ¼" cap.
No. 1 Campbell Nibbler, 6" throat, 3/16" cap.
No. 2 Campbell Nibbler, 12" throat, ⅜" cap.
No. 10A Quickwork Seamer, 20" throat, new
Magee Sheet Metal Wiring & Edging Machine, m.d.

SLOTTERS

84" Newton, m.d.

TAPPING MACHINES

No. 1 Garvin Knee Type, belt
Nos. 2, 2X Garvin Automatic
Gaterman Oscillating Pneumatic, ¾" cap. (3)
½" Rickert & Shaffer Vertical (2)
No. 5 Webster & Perks 5 spindle Vertical Nut, belt
6 spindle 1" Acme Semi-Auto. Nut, belt

WELDERS

200 ampere Lincoln Stable Arc
300 ampere General Electric
300 ampere Lincoln Stable Arc
Hobart Bros. 300 amp., gasoline engine drive

MISCELLANEOUS

Norton Running Balance Indicating Machine, m.d., 66" cap.
No. 5 Williams & White Bulldozer, belt
16" Heald Rotary Magnetic Chuck
Matson Cut-off Machine, s.p.d.
Walker Demagnetizer
Spragle Elec. Wks. Dynamometer, 250 H.P., 1500 RPM, 570 amp. 250 volts, complete with control equip.
No. 22 Williams & White Eye Bender, m.d.
12 H.P. Hercules Gasoline Engine
No. 2 Cochran-Bly Filing Machine
Gas Furnace 60x26½x20" inside cap.
No. 1 Fischer Oil Groover
Springfield Oil Separator, 1 peck size
Flynor Polishing Machine
Production Polishing Machine Type A
No. 11 Cochran-Bly Saw Sharpener, m.d.
No. 11B Cochran-Bly Saw Sharpener, m.d.
No. 1 Leighton Type Straightening Machine, m.d., ¾" to 1" dia. capacity with minimum length of 2¾".
Brand new, 2 in stock
¼" Shuster Wire Straightener, m.d., 8' max. length (2)
⅜" Shuster, belt, 6' length
Motors—all sizes—A.C. and D.C.—200 in stock

Our new building addition has now been completed, giving us a total floor area of 115,000 square feet. FURTHER ASSURANCE OF SPEEDY DELIVERY ON *BETTER REBUILT* MACHINE TOOLS and EQUIPMENT. All machines listed here are in our stock. If you don't find what you need listed, write or wire us anyway, and we'll try to get the unit for you.

MACHINERY CO.

CINCINNATI, OHIO

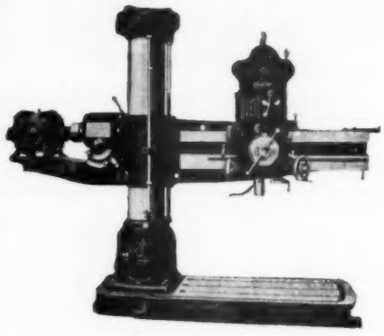
. . . ready to serve in

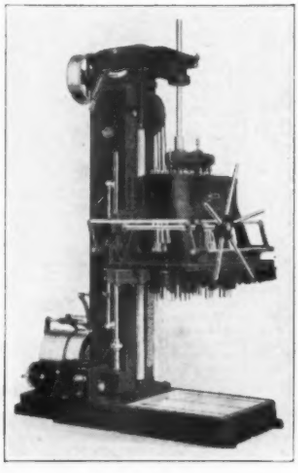
CINCINNATI'S

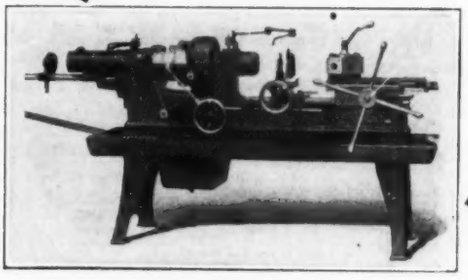
National defense has become a reality. No longer is it production for defense, but production to fulfill the needs of a mighty war machine. Consequently, demands for more and greater output have become the order of the day.

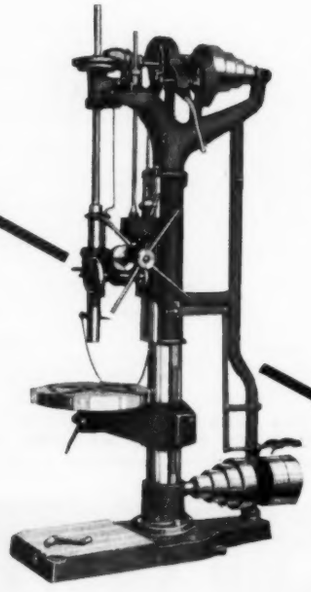
Under these conditions, the CINCINNATI MACHINERY & SUPPLY CO. urges all manufacturers to make use of CINCINNATI'S machine tool rebuilding facilities, so as to get the most from their existing machines. Also, CINCINNATI recommends the selection of their guaranteed rebuilt tools (a partial list appears at the right) . . . these units can be of infinite value in boosting output so vital to our national effort.

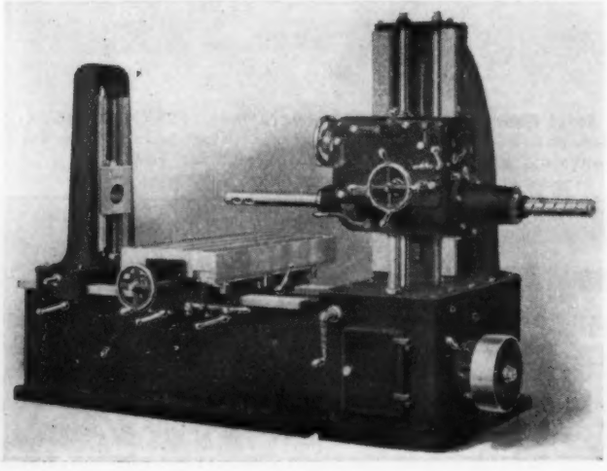
Here, then, are two services of which you can avail yourself . . . they are CINCINNATI'S contribution to the nationwide war effort. *We're helping you help . . . so, write, wire or phone us regarding the tools we have on hand, or the availability of our rebuilding facilities for your particular units! ! !*











the national war effort

REBUILDING FACILITIES, and REBUILT MACHINE TOOLS, *ARE AVAILABLE* . . .

TO RENDER VALUABLE PRODUCTION SERVICES FOR THE DURATION ! ! !

Lathes

14"x6' Hendey Geared Head Engine Lathe, M.D.

14"x8' American Cone Drive Lathe, Q.C.

16"x8' Monarch Cone Head Lathe, Q.C.

17"x8' LeBlond Cone Lathe, Q.C.

18"x8' Mueller Engine Lathe, Q.C.

18"x8' Sidney Engine Lathe, 3 S.C.D. Q.C.

19"x9' LeBlond H.D. Engine Lathe, 3 S.C.D. D.B.G.

20"x8' American H.D. Lathe, 3 S.C.D. D.B.G.

19"x12' Sidney H.D. Lathe, 3 S.C.D. D.B.G.

18"x8' Greaves Klusman Grd. Hd. Lathe, M.D.

20"x16' Greaves Klusman Grd. Hd. Lathe, M.D.

25"x16' LeBlond H.D. Screw Cutting Lathe. 3 S.C.D.

36"x20' Putnam 5 S.C.D. B.G.

42"x16' Boye & Emmes Engine Lathe, Cone drive, D.B.G. Q.C.

52"x14' Baker Engine Lathe, Cone drive, B.G.

16"x8' Lodge & Shipley Cone Drive, Q.C.

24"x12' Lodge & Shipley Pat. Hd. Q.C.

24"x10' Bradford Cone Drive.

Planers

60"x46"x12' Pond Planer, Belt Drive.

36"x36"x12' Liberty Dble Housing, Belt Drive.

36"x36"x20' Detrick & Harvey Openside, 3 Hds. Belt Drive.

24"x24"x6' Cincinnati Belt Drive.

Radial Drills & Upright Drills

4' Bickford Plain Radial Drill Gear Box Drive.

4' Fosdick Plain Radial Drill Gear Box Drive.

6' Bickford Plain Radial Drill Gear Box Drive.

4' Mueller Plain Radial Drill.

6' Dreses Plain Radial Drill.

4' American Triple Purpose Plain Radial Drill.

24" Aurora Upright Drill Press, Slid. Hd. Gear Feeds.

26" Barnes Upright Drill, Slid. Head. Tapping Attachment.

Gear Machinery

#2 Pfauter Gear Hobber, Belt Drive.

#2 Rhenania Gear Hobber.

#3-26" B & S Gear Cutter.

72" G & E Gear Cutter.

#1 Cross Gear Tooth Rounder.

Lipe Gear Tooth Rounders.

#1 Adams Gear Hobber.

#6 Fellows Gear Shaper.

Shapers

16" Steptoe Cone Drive.

16" American Cone Drive.

24" Milwaukee Cone Drive.

Horizontal Boring Mills

#0 Fosdick Plain Horz. Mill.

4" Bar Niles Horiz. Mill.

Grinders

12"x36" Landis Self Contained Grinder.

16"x72" Queen City Plain Grinding Machine, Self contained.

16"x60" Landis Self Contained Grinder.

6"x20" Fitchburg Plain Grinder.

#55 Heald Internal Grinders.

#60 & 65 Heald Internal Grinders.

Cataract Precision Grinder.

#51 Oliver Drill Grinding Machine.

12" Pratt & Whitney Vert. Surf. Grinder.

30" Besley Disc Grinder, Belt drive.

Turret Lathes

3"x36" J & L Two Spindle Turret Lathe.

#2 Warner & Swasey Turrets.

1½"x9" Acme Hand Screw Machine.

Miscellaneous

Quickwork Rotary Shear, M.D.

#1 Klemm Metal Cutting Band Saw.

36" Thrt. Gray Nibbler, Turret Head.

#1 Campbell Nibbling Machine.

Atkins Metal Cutting Band Saw.

35 K. W. Federal Spot Welder.

#1 Baker Keyseating Machine.

2" Acme Bolt Cutter.

2" Landis Double Spindle Bolt Cutter.

4" Williams Pipe Threading Machine.

2" Landis Geared Bolt Cutter.

8" Landis Pipe Machine, M.D.

#1 LaPointe Broaching Machine.

#56 Toledo Trimming Press.

20 spindle Natco Drill Press.

#1 Moline 10 spindle Hole Hog.

#5 Long & Alstatter Punch & Shear.

#3 Hilles & Jones 36" Thrt. Punch & Shear.

#9C Beloit Punch & Shear.

#1 Shuster Wire Straightener.

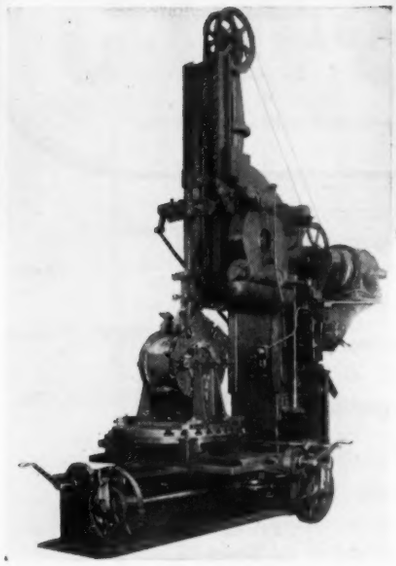
20 K. W. Butte Welder.

#15 Toledo Punch Presses.

CINCINNATI MACHINERY & SUPPLY CO.

217 E. Second St. Cincinnati, Ohio

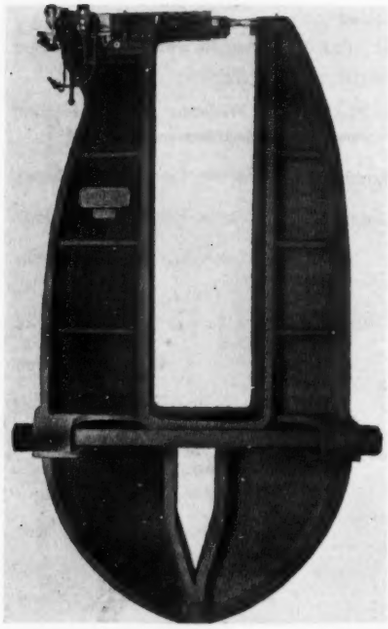
We'll Buy it— if You'll Sell it



48" NILES - BEMENT-POND Vertical Geared Slotter. Power feed rotary table; 50" dia. table; Motor Drive.

Idle machine tools are NOT helping produce the materials this country needs for war-time use. Manufacturers are pleading for more and more machinery to increase their production and we are doing our level-best to fill their needs. We can't perform feats of magic in meeting all demands. We've got to have the machinery available . . . wishful thinking doesn't help a bit!

We know there are large and small machine tool units collecting dust in many plants . . . unused for months . . . not earning their "bread and butter". We can turn this idle equipment into CASH for you . . . if you'll let us know what you have. Make an inventory of your unproductive equipment at once—both large and small units—and we'll do our best to put it where it will go to work AT ONCE! We work fast—
so write or wire us NOW.



150-ton CHAMBERSBURG Hydraulic Riveter. Multiple pressures, dies flush with top and bottom ram. Stroke 6"; depth of gap 150".

WE WANT TO PUT THESE TO WORK—*Interested?*

LATHES

92" x 32' Putnam Triple Geared Internal Face Plate Drive.
36"-60" Harrington Sliding Bed Gap; bed closed 16'—open 23'.

TURRET LATHES

24" Gisholt; 6¼" hollow spindle; Taper Attachment; Motor Drive.
21" Gisholt; 3½" hollow spindle; Taper Attachment; Motor Drive.

RADIAL DRILL & DRILL PRESSES

5-ft. American Triple Purpose; M. D.
8-spindle Natco Multiple Spindle.
6-spindle National Acme Horizontal.
4-spindle Edlund B.B. High Speed.
4-spindle Hoefer.
Single Spindle Leland Gifford B.B. Hi Speed.

AUTOMATICS

#6A Potter & Johnston; M.D.
#6C Potter & Johnston; M.D.

MILLERS

#4B Milwaukee. Vertical; Power Rapid Traverse; Motor - in - Base Type.
#3 Davis Thompson Rotary Miller; Motor Drive.

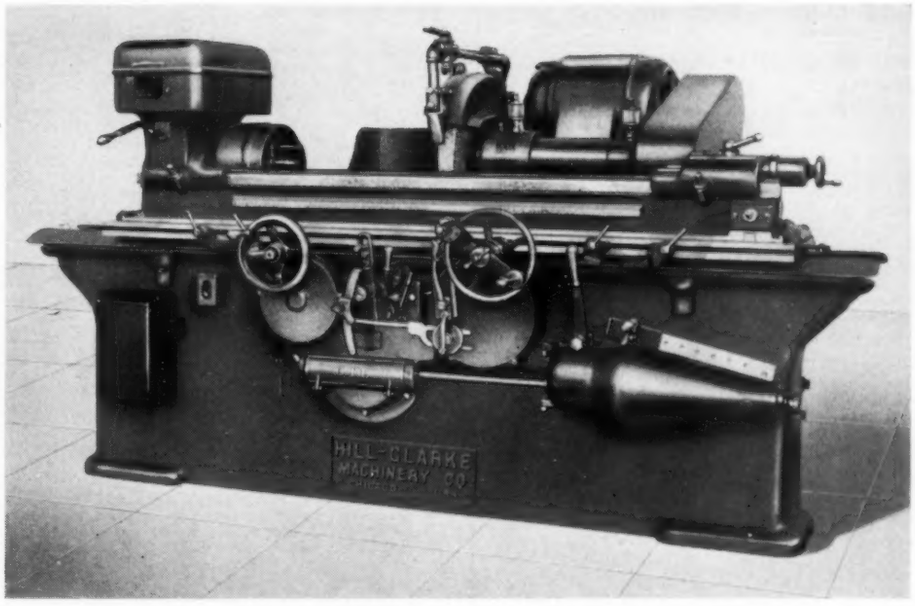
MISCELLANEOUS

BOLT THREADER, 2½" Landis Double Head; M.D.
KEYSEATERS, #2 Baker; #3A Mitts & Merrill
SAW Power Hack, 6" x 6" Racine
SHEAR, #2 Lennox Bevel; ¾" cap.
SHEAR, Hilles & Jones Throatless Geared Slitting; cap. ⅜" plate, ½" x 4" flats; 12" blades.
PIPE MACHINES, 2" & 6" Jarecki. 10" Standard Engineering.
GEAR GENERATOR, 11" Gleason Bevel
PLANER, 60" x 60" x 10' Cincinnati; M.D.
SLOTTER, 24" Newton

• SUN MACHINERY COMPANY •
36 Van Vechten St., Newark, N. J.

HILL-CLARKE
MOTOR DRIVEN GRINDERS

- ***MICRO FINISH***
- ***PRECISION LIMITS***
- ***PROMPT DELIVERY***



Plain Cylindrical Grinders

6 x 32	10-15 GAP x 24	14 x 36	16 x 50	18 x 96
10 x 18	10 x 36	14 x 50	16 x 72	
10 x 24	10 x 50	14 x 72		
	10 x 72	14 x 96		

Production Universal Grinders

12 x 36	20 x 36
12 x 50	20 x 50
12 x 72	20 x 72

COVERED BY U. S. PATENT NUMBERS
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2095089 2139397

HILL-CLARKE MACHINERY CO.
651 WASHINGTON BLVD. CHICAGO, ILL.

NESBITT

offers the following MACHINE TOOLS

FOR IMMEDIATE SHIPMENT *from* STOCK

AUTOMATICS

1¾" cap. Acme 4 spd M.D.
1—4spd. Gridley 1¼" cap. M.D.

BORING MILLS—Vertical

48" Niles Bement & Pond Car Wheel Borer.

BORING MILLS—Horizontal

3½" bar D & H Floor type M.D.

DRILLS

1—5' Niles Bement & Pond gear box S.P.D.
3½' Bickford un.
2 & 4 spd. Henry & Wright
24" Barnes camel back M.D.
4—22" Barnes P.F. M.D.
36" Cincinnati Bickford Sld. hd.
36" Aurora Sl. Hd.
36" Superior Sld. Hd.
4 spd. Barnes No. 4 Taper 82" x 17" tbl. p.f. to spd. M.D.
16 spd. Bosch, M.D. Oil grooved 54" x 30" rect. head No. 3 Morse Taper.
2 X Garvin Automatic Tapper
4—Langelier Bench High Speed
1—Demco S.S. High speed

FORGING HAMMERS

3—3000# Alliance, Steam drop forge.
2—2000# Morgan, Steam drop forge.
1—1500# Morgan, Steam drop forge.
1—1000# Morgan, Steam drop forge.

GEAR MACHINERY

Whitten automatic Gear Cutter spur and bevel
1—3-26" B & S Auto, Gear Cutter

GRINDERS

1—14 x 50 Lea. Mt. Dr. 3 mts. Un.
1—No. 1 Wilmarth and Marmon Un. T & C
10 x 48 No. 14 Brown and Sharpe Pl.
8 x 36 Fitchburg Pl.
3—No. 3 Brown and Sharpe T & C
12 x 36 Landis Un.

LATHES

2—12 x 5 Cleveland G. Hd. Taper Attch.
14 x 8 American C.P.D.
10 x 8 Flather M.D.
17 x 8 South Bend C.P.D.
14 x 6 LeBlond, 3 stepcone D.B.G.
10 x 10 South Bend C.P.D.
2—18 x 18 Mueller, 3 stepcone D.B.G.
2—18 x 8 Morris, 3 stepcone D.B.G.
24 x 12 Shoemaker and Boye D.B.G.
32 x 20 New Haven
50 x 24 Fifield Triple Geared
4 x 60 Fitchburg low swing—new cond.
42 x 26 Bement Triple geared
18 x 10 Monarch 3 stepcone D.B.G.
12 x 5 Hendey Yoke hd. Taper Attch.

PLANERS

30 x 30 x 8' New Haven

MILLERS

2—Producto-Matic Milling Mchs.
No. 3 Cincinnati, Pl.
No. 1 B Milwaukee double arm rack cutting attachment and vertical attachment.
No. 0 Van Norman hand.
Hendey and Becker Lincoln Type
AB Becker Vert. Rotary Table, New Condition
1—No. 3½ Fox Plain
No. 3 Lees Bradner Thread Miller
Holden Morgan Thread
No. 2 A Brown and Sharpe Vert. Hd.

TURRET LATHES

No. 1 Bardons and Oliver
No. 2 Warner and Swasey
4" Conradson Un.
No. 6 Brown and Sharpe

PRESSES

Bliss Incl. mt. dr.
2—No. 2 Standard O.B.I.
2—No. 18 Bliss O.B.I.
2—19½ Bliss O.B.I.
4¾ Michigan O.B.I.
Ferracute Bench O.B.I.
Toledo Arch G.M.D. #51.
No. 37 Niagara back Flywheel M.D.
No. 5 Stiles and Parker geared
No. CG 14 Ferracute O.B.I. Automatic roll Fl.

PRESS BRAKES

No. 255 D & K 72"-16 ga. Mt. dr.
10' x 10 gauge George Ohl Mt. dr.
6' x 10 ga. D & K Leaf Type Mt. dr.

SHAPERS

20" Steptoe C.P.D.
26" Kelly M.D.
24" Milwaukee C.P.D.

WELDERS

50 K.W. Thompson Spot Auto. 60 cycle
35 K.W. Thompson Spot Auto. 60 cycle
25 K.V.A. Thompson 25 cycle (three)
58 K.V.A. Thompson 25 cycle
20 K.W. Toledo 40 cycle
35 K.W. Thompson 25 cycle
25 K.W. Federal Butt Welder 25 cycle
45 K.W. Federal Butt Welder 25 cycle
8—200 AMP. Lincoln stable Arc Welders 25 cycle
1—G.E. 200 AMP. Arc Welder 25 cycle
1—150 AMP. Lincoln Shield Arc Welder 25 cycle

PIPE MACHINES

10" Cox
023 A Oster 6" cap.
10" Bignall & Keeler M.D.
6" Stover M.D.
Acme & Landis Bolt Thrd. Machs.

SAWS

3" Burr Cold
No. 12 Higley Cold
No. 3 Klemm Metal Band

MISCELLANEOUS

3—Grant Spinners
3A High Speed Hammer
Morton Keyseater 4" capacity
No. 0-2-3 La Pointe Broaches
1—No. 1 Gray Nibbler Tur. Type
6" Pilton Slotter
7" Rhodes M.D.
Wells Wire Straightener and Cut off

WOODWORKING MACHINERY

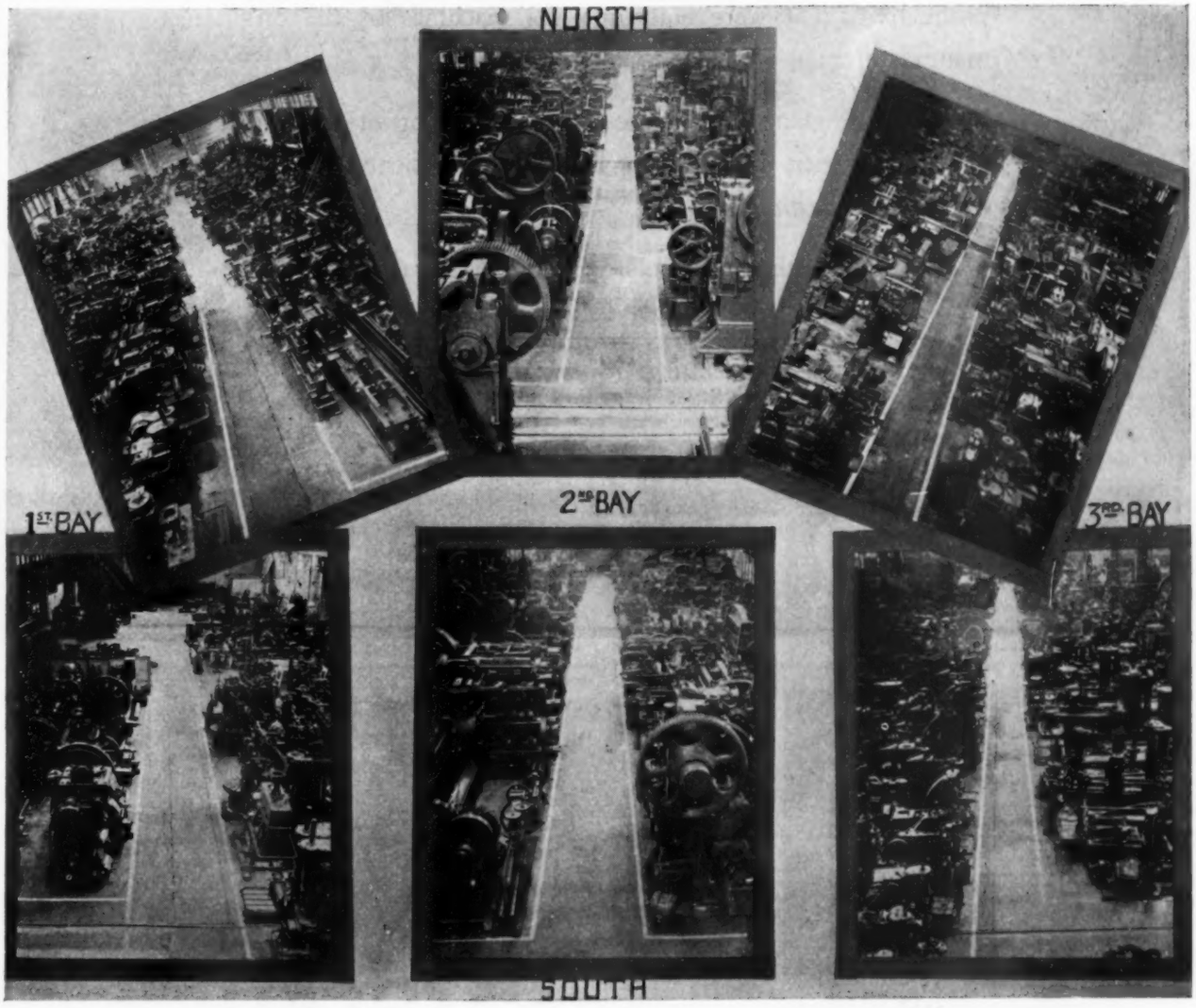
3 Drum Columbia Sander
Defiance single spdl. Boring Machine Mt. on spd.
Faye and Egan S. end Tenoner
6—Swing Cut-off saws
1—Automatic Glue Jointer
1—24" Oliver Jointer
1—No. 1 American Saw table
1—Smith Treadle Dado Saw table
1—New Britain Chain Mortising Machine
1—Friction feed Cut-off saw
1—Double end Cut-off saw
2—No. 2½ American Dbbl. Spdl. Shapers
Pettingill Saw Tenoning Machine

WRITE—PHONE—WIRE

NESBITT MACHINERY CO.

110 East Pratt Street **Baltimore, Maryland**

DON'T LET MACHINE TOOL DELIVERY PREVENT YOU FROM ACCEPTING DEFENSE WORK!



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We have available in our stock most any machine tool you need.

Write—wire—phone—or better yet, pay us a visit and see for yourself the large stock of equipment which we have available.

WE CAN SUPPLY MOST OF YOUR REQUIREMENTS!!
LET US HELP

LOUIS E. EMERMAN & CO.

1761 Elston Ave., Chicago, Ill.

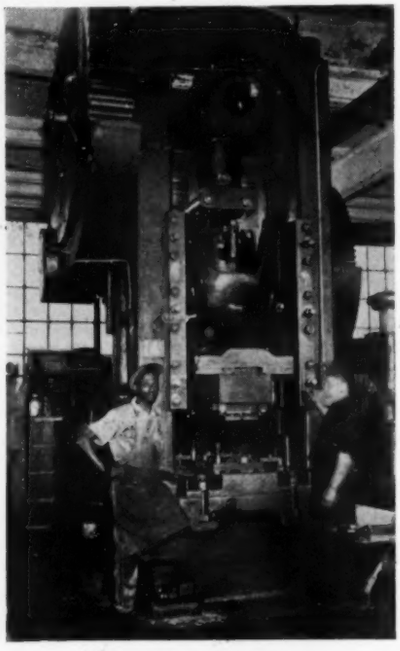
MOREY'S Re-Manufacturing Division *rebuilds* Machine Tools from the frame up, and restores the quality and productivity that were built into the machines by the original manufacturers.

We shall be glad to cooperate in the rebuilding of your present machines, which can give immediate and efficient service, *if in operating condition.*

Get in touch with us—we can be of REAL service!

WE HAVE FACILITIES TO HANDLE THE REBUILDING OF MACHINES WEIGHING UP TO 50 TONS!

MOREY MACHINERY CO., INC
410 BROOME ST., NEW YORK



#59½ TOLEDO
TIE ROD CONSTRUCTION
12" STROKE
12" CRANKSHAFT

MUNITION PRESSES!

WORLD'S LARGEST STOCK

REBUILT—GUARANTEED

HUNDREDS OF PRESSES IN STOCK

SEND US YOUR INQUIRIES

JOSEPH HYMAN & SONS
TIOGA, ALMOND & LIVINGSTON STS. PHILADELPHIA, PA.

We pledge ourselves to continue the policy of high grade rebuilding upon which we have built an enviable reputation

AUTOMATICS

1" **Cleveland** Model J double end threading, pointing, turning or drilling.
2" **Cleveland** Model A.
Nos. 24, 33 & 34 New Britain chucking.
No. 6A Potter & Johnston.
14" Fay automatic.
No. 16 Gisholt Simplimatics.

AIR COMPRESSORS

136', 8"x8" **Chicago Pneumatic Tool Co.**, type NSB.
136' 8"x8" **Ingersoll-Rand**, type ER1.
355', 12"x10" **Ingersoll-Rand**, type ER1.
357', 12"x10" **Bury**, class HL.
550', **National**, 3-cylinder vertical.
620', 14"x8¾"x10' **Sullivan, class** WJ3, angle compound, 2 stage, synchronous motor.
706', 17"x9¾"x12" **Sullivan**, class WJ3 angle.
868', 17"x10"x12" **Chicago Pneumatic Tool Co.**, type OCB. 2 stage.

BROACHES

No. 1 LaPointe, screw type.
No. 2 Standard screw type broaching press. 12" stroke.
No. 3 Oilgear hydraulic, motor drive.
Nos. 3 & 4 LaPointe of Hudson, screw type.
No. 3 J. N. LaPointe double screw type.
No. 3 American high speed, rack type.

DRILLS, RADIAL

3' **Cincinnati.**
4' **Hammond** sensitive, elbow arm, Tapper.
4' **American.**
3½', 5' & 7' **Western.**
6' **American**, 14" column.

GEAR MACHINERY

5A Cincinnati gear cutter.
No. 18H Gould & Eberhardt universal gear hobber.
12"x13" **No. 12H Gould & Eberhardt** Mfg. hobber.
12"x15" **No. 12 Barber Colman** hobbers.
24" **No. 3 Adams Farwell** gear hobber.
8"x10" **No. 1 Lees Bradner** production hobber.
14"x8" **No. 5A Lees Bradner** universal hobbers.
26"x8" **No. 3 Brown & Sharpe** auto. spur.
36"x6" **Gould & Eberhardt** spur gear cutter.
48"x10" **No. 4 Brown & Sharpe** automatic spur.
National Tool Co. (Cleveland) Model B gear and gear shaper cutter checking machine.
Lipe gear tooth chamfering machine, double spindle.

GRINDERS, CYLINDRICAL, PLAIN AND UNIVERSAL

6"x32" **Norton.**
10"x20" **Bath No. 1** universal.
10"x24" **Landis.**
10"x36" **Bath No. 2½** universal.
10"x36" **Norton.**
10"x30" **Norton.**
10"x52" **Landis.**
12"x36" **Landis self contained.**
12"x72" **Landis.**
16"x42" **Landis** universal

GRINDERS, SURFACE, TOOL & CUTTER

14" **Pratt & Whitney** ball bearing, vertical spindle surface.
No. 3 Barber Colman hob grinder.
6¼"x18" **Schuchardt & Schutte**, automatic hob.
Sellers & Gisholt tool grinders.
24" **Ingersoll** tub type face military cutter grinder.
2¼" **Wilmarth & Morman** drill grinder, belt drive.
2¾" **No. 5 Oliver** drill grinder.
Oliver drill point thinner.

GRINDERS, MISCELLANEOUS

No. 2 Heim centerless.
5"x7" **Pratt & Whitney** worm or thread grinder, cam feed type.
Pratt & Whitney worm grinder, screw feed or leader.
Hutto honing machine, type MD 583.
No. 72A3 Heald internal.
No. 6 Bryant internal.
No. 60 Heald cylinder.
No. 50 Heald hydraulic cylinder.
Type 15 Norton vertical lapping machines.
No. 575 Hawes continuous rod and tube polisher.
10"x50" **Norton** cam shaft grinder.
17"x36"-48" **Norton**, Type B, Model 84 hydraulic crankpin grinder.
30"x4" **No. 41 Ransom** double end, motor on spindle.
30"x84" **Diamond** face and edge, motor drive.

LATHES, ENGINE

All have quick change gears unless otherwise noted.
14"x 6' **LeBlond.**
14"x 8' **Lodge & Shipley**, patent head.
14"x8' & 10"x18' & 10"x8' **Monarch.**
16"x 6' **Cincinnati.**
16"x 8' **American.**
18"x 6' **Rahn Larmon.**
18"x 8' **Walcott.**
18"x 8' **American.**
19"x 8' **Sidney.**
20"x10' **American.**

LATHES, ENGINE (Con't)

20"x10' **Davis**, double back geared.
24"x10' **Schumacher & Boye**, D.B.G. & T.A.
24"x10' **LeBlond** heavy duty, D.B.G. & T.A.
24"x10½' **New Haven**, standard change gear.
24"x12' **Lodge & Shipley** patent head.
24"x14' **Schumacher Boye.**
24"x16' **Schumacher Boye**, D.B.G. & T.A.
36'-43"x18' **New Haven**, 23" bed extension.
36'-47½"x21'6" **Wickes** double back geared.

LATHES, TURRET

Most of these can be supplied either with bar feed and automatic chuck or arranged for chucking work.
No. 3A Warner & Swasey.
14" **Warner & Swasey.**
1½" (18" swing), **No. 3 Gisholt.**
1½" (17" swing), **No. 4 Foster**, power cross feed.
2¼"x26" **Acme.**
17½" swing **No. 4 Bardons & Oliver.**
18" swing **No. 4 Cincinnati Acme.**
21" **Gisholt.**
2¼"x24" **Jones & Lamson**, cross feeding headstock.
3"x36" (14½" swing) **Jones & Lamson**, cross feeding headstock.
24" **Steinle**, geared head.

LATHES, PRODUCTION

9"x14" **Porter** cable.
9"x24" **Sundstrand.**
13"x 4' **LeBlond** geared head.
13"x 6' **Automatic** threading lathes, geared head.
16"x 5' **Monarch** Mfg. or rapid production.
16"x10' **LeBlond** rapid production.
18"x 7'-6" **Wickes** geared head, rapid production.
20"x8' **Wickes** 12 speed selective geared head Rapid Prod.
34"x61½" **between spindles Wickes** semi-automatic center drive crankshaft.
Melling 4 cylinder camshaft lathe.
Melling 6 cylinder crankshaft lathe.

MILLS, VERTICAL BORING

34" **Colburn.**
36" **Niles** car wheel boring.
60" **Bullard**, 2 swivel heads, power rapid traverse, motor drive.
62" **Colburn**, 2 swivel heads, motor drive, power rapid traverse.

MILLING MACHINES

No. 2A Owen, universal.
No. 14A Garvin, plain. Range 28"x8"x19", plain.
No. 34 Ohio (Oesterlein) plain. Range 34"x12"x19".
No. 3 Van Norman duplex.

MILLING MACHINES, VERTICAL

No. 6 Becker, 18"x61" table.
Model AB Becker, 10⅝"x32¾" table.
No. 3 Becker, 10¼"x28" table.
Model C Becker, 29¾" rotary table.
Nos. 1 & 1½ Knight.
No. 5 Brown & Sharpe. 16"x52" table. Range 52"x12"x24". Has 20" dia. power feed rotary table.

MILLERS, PRODUCTION AND MISCELLANEOUS

Sundstrand Rigidmill with rotary table.
12" **Cincinnati** plain and BG Mfg. millers.
48" **Newton**, 2 spindle continuous rotary.
60" **Ingersoll**, 3 spindle, continuous rotary.
No. 45 Bilton Productomatic.
Nos. 3, 3B & 6 Lees Bradner thread miller.
No. 3½ Fox, hand.
No. 33 Kempsmith Mfg.
Nos. 1 & 1A Davis & Thompson drum type continuous.

PLANERS

24"x24"x24" **Cincinnati**, crank type, one rail head.
24"x24"x 5' & 6' **Gray**, 1 rail head.
24"x24"x 6' **Woodward & Powell**, 1 rail head.
26"x26"x 8' **American**, 1 rail head.
30"x30"x10' **Cincinnati**, one (or two) rail heads.
32"x32"x12' **Niles**, 1 rail and 1 side head.
36"x36"x1[illegible]' **Woodward & Powell.**
56"x56"x16' **Gray**, 2 rail and 2 side heads.

PRESSES

No. 21½ Bliss OBI, geared, 2¾" stroke, 6700 lbs.
71 ton Waterbury Farrel OBI, 4" stroke, 8300 lbs.
No. 62 Bliss openback non-inclinable, 8" stroke.
No. 76 Toledo, O. B. non-inclinable, geared.
40 ton No. 6, series A Waterbury Farrel openback non-inclinable, 1½" stroke, 3700 lbs.
28" **No. 71 Swaine** double crank. 3" crank. 1" stroke.
44" **Leffler** double crank, geared, 5" stroke, 88 ton.
No. 4 Massillon S.S., geared, 5" stroke, 9650 lbs.
No. 65 Bliss Consolidated, S.S., geared, 3" stroke.
No. 7 Rockford S.S., geared, 3¾" stroke, 9000 lbs.
No. 8-7 Zeh & Hahnemann S.S., geared, 2¾" stroke.
No. 53 Toledo, S.S. 3" stroke, 3300 lbs.
No. 55½ Toledo, S.S. 3" & 4" stroke.
No. 57S Toledo S.S., tiered frame, eccentric shaft 6" & 10⅝" dia., 4½" stroke, 21,320 lbs.

PRESSES (Con't)

No. 30E Cleveland S.S., double geared, twin drive, 14" stroke, 1300 ton capacity, 235,000 lbs.
750 ton Baldwin Southwark triple action hydraulically operated toggle drawing press. Between uprights 11'-10½", shut height 84", strokes 37", 26" and 12". Weight 500,000 lbs.
No. 796¼D Toledo 108" double crank, toggle drawing.
No. 180 Toledo, 60"x60" single crank, double geared toggle drawing, approx. weight 189,500 lbs.
No. CA14 Ferracute horning. Adjustable bed.
No. P2 Ferracute, punching, 1" stroke, 2500 lbs.

PUNCHES

Williams & White combination shear for bars, angles, channels, beams, tees with notcher.
6" **throat** ⅝"x6" **Hendley & Whittemore No. 54**, punch, rod cutter and shear, with angle shear attach.
12" **throat**, 1¼"x1 **Long & Allstatter No. 1½**, architectural jaw.
12" **throat**, 1¼"x1" **Cleveland** horizontal, arch. jaw.
25" **throat**, ¾"x¾" **Cleveland**, architectural jaw.
26" **throat**, ¾"x¾" **Rock River**, architectural jaw.

SAWS, METAL

Nos. 12, 12B & 14 Higley cold saw.
8"x16" **Kalamazoo** metal band (new).
6"x6" **Toledo** hack saw (new).
6"x6" **No. 14 Atkins Kwik-Kut** hack saw.
8"x8" **Racine** hack saw.
8"x18" **No. 6 Robertson** hack saw.
No. 2 Grabo metal saw table.
No. 17 Racine abrasive cut-off machine, 2¼" capacity.
Reed Prentice "Precision" band sawing machine for internal and external work.

SHAPERS

7" **Rhodes.**
15" **American.**
16" **Walcott.**
20" **Smith & Mills.**
22" **Ohio.**
24" **Gould & Eberhardt.**
24" **Cincinnati.**
24" **Rockford.**
24"x24"x24" **Cincinnati** crank shaper planer.
32" & 36" **Morton** draw cut.

SHEET METAL AND WIRE MACHINERY

4'x3/16" **Cincinnati** press brake.
72"x14 ga. **Stamco** squaring, motor drive.
No. 1A Ajax taper forging roll.
Yoder fender roll.
⅜"x3' & 5' **Shuster** wire straightener and cutters.

SLOTTERS

12" **Dill** adjustable head. Motor drive.

THREADERS (BOLT CUTTERS)

½" **Acme** 2-spindle.
½" **Webster & Perks** 2-spindle.
1⅛" **Geometric** with 1" Murchey die head.
2" **Landis**, 1- & 2-spindle.
2" **Landis** two spindle pipe and nipple threader.
2" **Acme.**
1½" & 2½" **Landis** 2 spindle with lead screws.
1" & 2½" **Landis.**

UPSETTERS AND HEADERS

1½" **Ajax** steel frame, continuous motion.
1½" **Acme** steel frame stop motion.
1½" **No. 6 American Machinery Co.**, stop motion.
2" **National** steel frame, suspended slides, overhung guide on ram. Vee belt motor drive, stop motion.
2½" **Ajax** steel frame, suspended slide, stop motion, twin drive gears, stop motion.
4" **Ajax** steel frame, stop motion, original model, single geared.
4" **Ajax** steel frame, suspended slide, twin geared, stop motion.

WELDERS

12 **KVA American Electric Fusion**, BW 16, spot.
17 **KVA Thomson Gibb** type D 18-17, 440 V., spot.
18 **KVA American Electric Fusion**, No. MD30, spot.
20 **KVA Agnew**, type 10D, 440 V., spot, 16" reach.
20 **KVA Taylor**, 440 V., spot, 14" reach.
20 **KW Taylor Moesta**, 440 V., portable gun type.
20 **KW National** spot, 28" reach, 220 Volt.
23 **KVA Winfield**, type S 18 M-8H, 440 V., spot.
25 **KVA Winfield**, type B8, 220 V., butt.
35 **KW Federal**, type 60, 440 V., automatic butt.
65 **KW Federal**, type 10A, 440 V., butt.
75 **KVA Federal**, type 61, 440 V., mechanical upset air clamping flash butt.
150 **KVA Swift** flash butt welder, 440 Volt.
150 **KVA American Electric Fusion**, type HJ 10, 440 volt, air operated multiple welder.

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METAL WORKING MACHINERY

BORING MILLS
72" Miles Vert. belt, will swing 84" for height of 12".

DRILLS
6' Western Plain Radial, mtr. dr.
12" Sipp, sensitive, mtr. dr. #2 MT.
20-spindle Natco multiple, head 14x27, #2 MT. mtr. dr.

GRINDERS
20"x144" Landis Plain Cylindrical, mtrzd.
12"x 36" Pratt & Whitney Surface.
12"x 30" Modern Plain Cyl. mtr. dr.

KEYSEATER
#2 Baker, cap. 2"x20" belt dr. equip.

LATHES
32"x20' LeBlond, q.c. mtrzd.
27"x24' Lodge & Davis, belt dr. pl. chg.
18"x16' Flather, quick change, b.d.
14"x8' Walcott, b.d. quick change.
14"-24"x6' Barnes slid. bed. gap, belt dr.

MILLERS
#15 Garvin, belt, table 10"x42".
#4 Cincinnati Plain dbg. mtrzd. w.s. table 16"x63".
#5 B&S Vert. table 52x15½", with rotary table, m.d.

PIPE MACHINES
½"-2" Landis, b.d.

PLANERS
36"x36"x10' Gleason, one head, belt drive.
72"x72"x20' Putnam belt, 4 heads.

POWER PRESSES
#4 Federal Inclinable, bed 27"x14", stroke 3", cap. 37 tons.
#2½C Brown Inclinable, bed 17"x 14", stroke, 7", cap. 25 tons.

SHAPERS
20" Steptoe, gear box, mtr. dr.

POWER PLANT EQUIPMENT

TURRET LATHES
30" Bogart heavy duty 4¼" hole.
3"x36" J & L. geared head, mtr. dr.
2¼"x24" J. & L. geared head,mtr. dr.
1⅜" Pratt & Whitney, belt collets.
⅝" Garvin #1SP, belt, collets.

PLATE SHOP EQUIPMENT
10" Beloit, #55 comb. cap. punch 1"x¾", shear ⅞x4.
24" Rock River, cap. ½"x½".
34" Hilles & Jones #3 Punch, cap. 1¼x1; 42" Hilles & Jones #4 Punch, cap. 1¾x1.
Long & Allstatter combination Punch & Bender.
10' Hilles & Jones Bending Roll, 11½x9" rolls, mtr. dr.
18' Wickes Bending Roll, 20"x15" rolls, mtr. dr.

STEAM ENGINE SETS
125 Volt D.C.
35 K. W. G.E. Marine Vertical
100 K. W. Ames Uniflow Horiz.
125 K.W. Skinner Uniflow Horiz.
150 K. W. Harrisburg Uniflow Horiz.
200 K. W. Skinner Uniflow Horiz.

STEAM ENGINE SETS
250 Volt D. C.
450 K. W. Nordberg Uniflow Horiz.
300 K.W. Skinner Uniflow 3 wire.
300 K. W. Fitchburg 4 valve.
250 K. W. Harrisburg Uniflow.
400 K. W. Ridgeway 4 valve. 3 wire.
50 K. W. Ames Uniflow 3 wire.

AIR COMPRESSORS
1072 Cu. Ft. Sullivan Class WJ3.
868 Cu. Ft. Ingersoll-Rand T. XCB.
676 Cu. Ft. Ingersoll-Rand T. XCB.
600 Cu. Ft. Worthington.
528 Cu. Ft. Ingersoll-Rand 14x12 ER.
368 Cu. Ft. Ingersoll-Rand 12x10 ER.
368 Cu. Ft. Worthington 12x10.
254 Cu. Ft. Chicago Pn. 10x10 NSB.
240 Cu. Ft. Pennsylvania AA 10x9.
202 Cu. Ft. Chicago Pn. 8x6 Dup.
173 Cu. Ft. Ingersoll-Rand 9x8 ER.

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LATHES

HENDEY 14"x6' Q.C., T.A.
MONARCH 18"x6' Motor-in-Base, Q.C.
LODGE & SHIPLEY 14"x6' Geared Head, Q.C.
DAVIS 12"x5' Q.C.
SIMPLEX 16"x6' Q.C.
ROCKFORD 16"x6' Q.C.
SIDNEY 16"x6' Q.C.
SPRINGFIELD 16"x8' Q.C., T.A.
CHARD 16"x6' Motor-in-Base, Q.C.
LeBlond 16"x12' Q.C.
JOHNSON JR. 20"x12' Geared Head, Q.C., T.A.
McCABE 20"x40"x12' two-in-one Q.C.
DRAPER 27"x16'.
NATIONAL 40"x18' Geared Face Plate

MILLERS

BROWN & SHARPE No. 2A Univ. with Divid. Hds., Vert. MD
BROWN & SHARPE No. 2B Plain with Vert. Head, MD
CINCINNATI Nos. 1½, and 4 Univ.
GARVIN Nos. 1½, and 2 Univ. complete, MD
BRIDGEPORT Vert. Miller or Jig Borer, 20"x48"
HENDEY-NORTON No. 1¼ Univ. with Divid. Hds., MD
KEMPSMITH No. 2 Univ. Miller, complete
BECKER No. 5B Vertical Miller with Rotary Table
INGERSOLL Slab Miller
FOX Millers, power feed, MD

GRINDERS

3 BROWN & SHARPE #2 Surf. Grinders.
1 Brown & Sharpe #3 Planer Type Surf. Grinder.
1 Pratt & Whitney 14" Vert. Surf. Grinder, B. B.
1 Brown & Sharpe #12 Pl. Cyl. Grinder.
1 Landis 12"x36" Pl. Cyl. Grinder.
1 Walker 12" Vert. Grinder.
1 Brown & Sharpe #1 Univ. Grinder.

DRILLS

FOSDICK 3½" Radial, MD
CINCINNATI-BICKFORD 21" Upright, Tapp. Attach.
HAMILTON 24" Upright Tapp. Attach.
PRENTICE 26" Upright, Tapp. Attach.

SCREW MACHINES

GRIDLEY Four Spindle ¾"
NATL. ACME Four Spindle, No. 52
HAYDEN Five Spindle ¾"x3"
CLEVELAND ⅝", 2½" Single Spindle
BROWN & SHARPE No. 00 cutoff, #0 screw
WARNER & SWASEY No. 8 Turret, 3" hole
WARNER & SWASEY No. 4 Turret
REED-PRENTICE Geared Head Turret, 18" swing
JONES and LAMSON 2¼"x24", 3"x36" Turret

BORING MILLS

Cleveland 2½" Bar, Horiz. Boring Mill, Table Type, with rotary table and milling attachment.
1 Fitchburg 2½" Bar, Horiz. Boring Mill, Knee-Type.
1 Betts 3" Bar, Horiz. Boring Mill, Knee-Type.
1 Bullard 30" Vert. Boring Mill with hex. Turret.
1 Bickford 32" Vert. Boring Mill, 2 Swivel heads.

SHAPERS and PLANERS

GOULD & EBERHARDT 16", 20", 24"
AMERICAN 28"
KELLY 24"
SMITH & MILLS 24"
MATTISON 20", MD
CINCINNATI 36"x36"x10' two heads
SELLERS 36"x36"x9' four heads
POWELL 36"x36"x8'

PRESSES

TOLEDO No. 7 OBI Geared, MD
BLISS-CONSOLIDATED No. 8 OBI Geared
BLISS Nos. 18, 19, 19¼, 20, 21, 21½ OBI
BLISS Nos. 1, 1½, 3½, 4 and 13 Toggle Draw.
BLISS Nos. 1, 2, 4B, 4½ Double Crank
CONSOLIDATED 72" Double Crank, Twin Drive
CONSOLIDATED Nos. 24 and 84 Horning
BLISS Nos. 16, 39, 39¼ and 40 Horning
CONSOLIDATED 36" width Double Crank Horning
TOLEDO and BLISS 400 ton Knuckle Joint or Coining
WATERBURY FARREL Eyelet Presses
ADRIANCE No. 406A Arch Geared
NIAGARA No. 86 Double Action OBI
WATERBURY FARREL Dial Feed Cartridge Shell Presses, all long stroke
WATERBURY FARREL Horizontal Rack and Pinion Shell Reducing Presses
BAIRD No. 3 Tandem Press with Roll Feed

SHEET METAL

NIAGARA 10'x3/16" Shear, MD
STOLL 42"x16 gauge Shear
BLISS 30"x14 gauge Shears
NIAGARA Circle Shears

CINCINNATI 12'x¼" Shears
CINCINNATI 14' Press Brake

YODER C36 Gang Slitter, MD
BLISS 225A Gang Slitters
TOLEDO 52" Gang Slitter
LAMB & NASH 72" Gang Slitter
YODER Twenty Stand Roll Former
KANE & ROACH Seven Stand Roll Former
STANDARD 8"x10" Rolling Mill
BLAKE & JOHNSON 12"x12" Rolling Mill
BRODEN 5"x8" Wire Flattening Mills
OHL 10'x10 gauge Press Brake
VERDES, KAPPES 66" Press Brakes
DREIS & KRUMP 10'x10 gauge Power Box and Pan Brake
DREIS & KRUMP 8' Hand Box and Pan Brake
PELS No. 13 Combination Punch and Shear, with Coper, MD
RYERSON-KLING Nos. 3, and 4 All Steel Combination Punch and Shear with Copers, MD
WELDERS—Spot, Butt and Seam

WIRE WORKING

BAIRD, NILSON and MANVILLE Nos. 1, 2, 3 and 4 Four Slide
SLEEPER & HARTLEY Nos. 0, 2, 2½ and 4 Univ. Spring Coiler
SLEEPER & HARTLEY No. 3 Torsion Spring Winder
SHUSTER, LEWIS and WELLS—Auto. Wire Straightening and Cutting machines, all sizes
WELLS Bed Spring Machinery
WATERBURY FARREL and MANVILLE—Cold Rivet Headers and Thread Rollers
WATERBURY FARREL Wire Drawing
NATIONAL Bent Tappers and Wire Nail Machines
BARRED Wire Making Machine
TORRINGTON and LANGELIER Wire and Tube Swedgers

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AUTOMATICS

Nos. 24 & 34 New Britain Automatic Chucking Machines, m.d. (6).

Cleveland Models A, B, C, 1¼", 2" (12).

DRILLS

#310 Baker, 2¼" capacity (6).
3' and 5' Western Radial.
Fox Mult. Spdle. with tapp. att. (4).
#121, 2 spin. Bakers, rotary tables, m.d. (3).
Kingsbury 4-spdle., with auto. index. device.
24" Barnes, m.d., self oiling.

GEAR EQUIPMENT

#36ST Gould & Eberhardt Gear Gasher.
#5A Lees Bradner Hobbers (3).
Williams & White, cap. 96" dia., x 52" face.
#3 B & S Gear Cutter (2).

GRINDERS

#15A Bryant Internal & Face.
#55 and 60 Heald Internals.
20" Badger Face, hyd. feeds, 44" travel, m.d.
Norton Model B Plunge Cut, Automatic, m.d.
#1 Osterholm Face.
#126 Gardner double spindle, hyd. feed.
#6 and 20 Bryant Internal (4).
16" x 36" Cincinnati Plain Dyl.
12" x 36" Landis Plain Cyl, m.d.
10" x 24" Norton Plain Cyl, m.d.
10" x 36" Norton, Plain Cyl.

LATHES

16" x 8' Lodge & Shipley pat. hd.
16" x 6' Hendey q.c., m.d.
16" x 12' Lodge & Shipley.
18" x 8' Leblond.
16" x 6' South Bend.

24" x 16' Prentice Geared Head.
36" x 16' Hamilton Geared Head, m.d.
28" x 8' Chard, q.c., t.a.
26" x 14' Walcott, q.c., t.a.
40" x 18' Johnson.

LATHES — TURRET & PRODUCTION

5A Potter & Johnston, m.d. (2).
34" x 11' Wickes Crankshaft, (2).
18" Acme, 1½" cap., (2).
2¼" x 24" J & L, bar eqpt.
3" x 36" J & L, bar eqpt.
#5 Foster Universal, (3).
3" x 36" J & L, double spin.
3¼" x 36" Acme Geared Head.

24" Steinle, geared head, Universal, V.M.D., rapid traverse, (2).
26" Libby Model C Universal, rapid traverse, m. d.

MILLS

Binsee 3¾" Horizontal Boring.
Niles 28" Vertical Boring.
#3 Becker Vertical, m.d.
Nos. 1, 2 and 3 Craftsman Rotary Production.
54" Ingersoll Rotary, 3 head, m.d.
66" Newton Rotary, m.d.
4-spindle Newton Rotary, drum type.

PRESSES

#407A Bliss Double Crank Toggle, m.d. & m.
#410A Bliss Double Crank Toggle, m.d. & m.
#7F Bliss Double Crank, tie rod, Marquette cushions, 38" x 95" area bed.
#6C Rockford Double Crank.

WELDERS

150 KW Federal, m.d.
Taylor Winfield, 4-way Flash.
Thomson Gibb 200 KVA Automatic, m.d.

MISCELLANEOUS

Balancer, 18" Gisholt Static, (2).
Broach, 6-ton American Vertical Hydraulic, m.d.
Bulldozers, Nos. 3 & 5 Williams & White
Core Blower, #6 Demmler, (3).
Furnace, General Electric, 15 KW, 110 volt.
Hone, Model MJ Hutto, 36" working stroke, m.d. & m.
Hone, Hutto, 52" working stroke, m.d. & m.
Rivet Heaters, Berwick, (4).
Slitter, 42" Yoder.
Thread Mill, 6" x 14" Pratt & Whitney.
Threader, Rickert & Shaefer, auto. index.
Trucks, Elwell Parker Elec. Mule; 3-ton Auto. Hi-Lift.
Upsetter, 1½" Acme Steel Bed.
Wire Straighteners, 3/16" and 1/4" Shuster, to 20' long.
X-Ray Machine, General Electric, 250,000 volt, cap. 2¾" solid steel.

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BOLT CUTTERS, 1"-3½", 1-2-3 heads
BORING MILLS, Horiz. 3¾" & 5" bar Barrett
BORING MILL, Vert. 42" Bement-Miles, 1 head, B.D.
BRAKE, 8'x12 ga. D & K, S.P.D.
BULLDOZERS, No. 2 & No. 4 Wms. & White, M.D.
CUT-OFF MACHINE, 3" Hurlburt Rogers
CUT-OFF MACHINE, 16" Treadwell, M.D.
DRILLS, Mult. 2-Spdl., 3-Spdl., 4-Spdl. & 10-Spdl.,
DRILLS, Radial, 2', 3' & 3½', T.A., M.D.
DRILLS, Upright, 14" to 36", B.D. & M.D.
DIE FILERS, No. 3 Thiel, M.D. (2)
GEAR CUTTERS, Spur, 30", 40" & 84", M.D.
GEAR PLANERS, Bevel, 36" & 54" Gleason, M.D.
GRINDER, Disc, No. 6 Gardner, 10 H.P., M.D.
GRINDERS, Dbl. End, 24" & 12" Marschke, M.D.
GRINDER, Univ. No. 5 B & S, 20"x 72", B.D.
GRINDER, Univ. Hydraulic, 10"x24" Landis, M.D.
HAMMERS, Board Drop, 500 lb.-3000 lb.
HAMMERS, Steam Drop, 1000-2000 & 3000 lb.
HAMMERS, Steam Forging, 1000-6000 lb.
HAMMER, Power, 50# Little Giant, S.P.D.
HAMMERS, Power, 300# Bradley Compact & Upright Helve
LATHE, 16"-24"x8' South Bend Gap, [illegible]
LATHE, 18"x5' Milwaukee, D.B.G., Q.C.G., B.D.
LATHE, 18"x6' American, Q.C.G., T.A., B.D.
LATHE, 21"x8' LeBlond Heavy Duty, D.B.G., B.D.
LATHE, 26"x14' Putnam Heavy Duty, D.B.G., B.D.
LATHE, 27"x11' LeBlond Geared Head, D.B.G., M.D.
LATHE, 27"x12' Putnam, Q.C.G., D.B.G., B.D.
LATHE, 36"x26'6" New Haven, P.C.G., B.D.
LATHE, 48"x22½' Johnson Trip. Grd., B.D.
LATHE, 48"x26½' Johnson Trip. Grd., B.D.
LATHE, Wheel, 78" Bement-Miles, M.D.
LATHE, Turret No. 1-A Warner & Swasey, M.D. (2)
LATHE, Turret No. 4 Warner & Swasey, M.D. (2)
LATHE, Turret 2½"x26" P & W Grd. Head, M.D.
LATHE, Turret 26" Libby "C", H.S. 4¼", M.D.
LATHE, Turret C-7 Libby Heavy Duty, M.D.
LATHE, Turret, 3"x36" Jones-Lamson, bar & chucking, S.P.D.
MILLER, Plain No. 12 B & S, tbl. 99"x6", B.D.
MILLER, Vert. No. 2 Becker, tbl. 30" x87½", M.D.
MILLER, Vert. Taylor-Fenn, tbl. 20"x6", M.D.
MILLER, Slab, Ingersoll, tbl. 9½'x 21", B.D.
MILLERS, Thread, Smalley General 12"x36" & 14"x3", M.D.
MILLER, Thread, Pratt-Whitney 4x" x12", M.D.
PLANER, 30"x30"x8' Cincinnati, 2 heads, M.D.
PLANER, 36"x36"x11' Sellers, 2 heads, A.C., M.D.
PLANER, 42"x42"x12' Gray, 4 heads, B.D.
PLANER, 48"x48"x12' Sellers, 4 heads, M.D.
PUNCH, No. 2 H & J, Dbl. End, thrt. 36", 1"-¾", M.D.
PUNCH, No. 3 H & J Horiz. thrt. 48", 1½"-1", M.D.
PUNCH, No. 4 H & J Horiz. thrt, 48", 1½"-1", M.D.
PUNCH & SHEAR, No. 3 L&A, ¾"-1¼"
PUNCH & SHEAR, Cleveland EF, thrt. 36", 1¼"-1"
PUNCH & SHEAR, arch. jaw, Cleve. EF, thrts. 36", 1"-1".
PUNCH & SHEAR, Cleve "G", 2"-1", M.D.
PUNCH, Sgl. End, 3-A Boyersford, thrt. 10", 1"-¾".
PUNCH, Mult. 10' bed L & A, 340 tons, "E"
PIPE MACHINES, 3"-4"-12"-18" Wetland, B.D.
PIPE MACHINE, Geared Head 12" Landis, M.D.
PIPE MACHINE, 2½"-8" Williams, M.D.
PRESS, Hydraulic 100 ton Watson Stillman, M.D.
PRESS, Hydraulic 250 ton Baldwin Southwark
PRESS, Hydraulic, 1000 ton Woods, M.D.
PRESS, Forging, 1500 ton Farrell Birmingham
PRESS, O.B.I. No. 68-C Bliss, stroke 2"
PRESS, O.B.I. No. 2 Loshbaugh Jordan, stroke 2".
PRESS, Perforating, No. 51 V & O, B.D.
PRESS, Straightening, Hunt Hydraulic, 50 tons
PRESS, Toggle, 500 ton Garrison, Tie-Rod
PRESS, Toggle, No. 1½ Bliss, M.D.
PNEU. RIVETER, Hanna 30 ton, 75" reach
PNEU. RIVETER, Hanna 80 ton, 126" reach
PNEU. RIVETER, Hanna 150 ton, 150" reach
SHAPER, 16" Cincinnati High Duty, M.D.
SHAPER, Draw-Cut 48" Morton, M.D.
SLOTTER, 18" Bement-Miles, table 36", M.D.
SHEAR, Alligator, Pittsburgh, cap. 2"-2½".
SHEAR, Alligator, No. 4 D & K, cap. 3", M.D.
SHEAR, Alligator, No. 61 Carlin, 3" rd.
SHEAR, Plate, 72"x1¼" United, M.D.
SHEAR, Plate, 125"x3/16", Hyde Park, gap 15".
SHEAR, Plate, 156"x3/16", Hyde Park, gap 15".
SHEAR, Plate, 54"x3/16" Hyde Park, gap 8½".
SHEAR, Plate, 9'x1" Mesta, throat 36", B.D.
SHEAR, Plate, 10'x¼" Pittsburgh, gap 15½".
SHEAR, Plate, 96"x1¼" Morgan, M.D.
SHEAR, Plate, 132"x1½" Morgan, thrt. 51", M.D.
SHEAR, Squaring, 72"x18 ga. Streine
SHEAR, Squaring, 36"x½" United, B.D.
SAW, Band JM Laidlaw, M.D.
SAW, Hack 8"x8" Robertson, S.P.D.
SAW, Friction, No. 3 Ryerson, M.D.
SCREW MACHINE, 1½"x9" Acme, H.S., 1½", M.D.
SCREW MACHINE, No. 24 New Britain 4-Spdl. Automatic
TAPER, Duplex Garvin, ¼"-¾", M.D.
UPSETTER, 4" Ajax, steel bed, M.D.
WELDERS, 150 amp. & 200 amp. portable

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1 1/4" Cone 4-spindle Automatics
7/8" Cone 4-spindle Automatics
7/8" Gridley 4-spindle Automatics
9/16" Gridley 4-spindle Automatics
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2 1/4" and 3 1/4" Gridley single-spindle Automatics
#0 Brown & Sharpe Automatics

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2¼" **Gridley**, 4 spindle Auto. **Screw Machine**
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Cleveland Model A, ⅝", ⅞", 1¼", 2", 2¼" Auto. **Screw Machine**
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Becker No. 25 Plain, cone
Becker No. 2A, 2, 3, 4, **Vertical Millers**
Pratt & Whitney No. 6 **Hand Miller**
Ohio 48" **Tilted Off-Set Miller**
No. 3, 2, 4, **Cincinnati Plain Millers**
No. 1, 2, 3, **Brown & Sharpe Plain Millers**
Cincinnati No. 2, 3 **Universal Millers**
Gooley & Edlund Model B **Production Miller**
24" **Bullard Vertical Turret Lathe**
Bardons & Oliver No. 2, 4 **Turret lathes**
Foster No. 2, 4, 10 **Turret lathes**
J. & L. 2x24", 3x36" **Turret lathes**
Warner & Swasey No. 2, 4, 6 **Turret Lathes**
24"x14' **Reed-Prentice** Grd. Hd. **lathe**, taper attach.
L. & S. 16"x7', 12 speed Grd. Hd. **lathe**
16"x6' **American** Q.C.G. **lathe**
24"x8' **Hendey** Grd. Head, Q.C.G. **lathe**, M.D.
16"x8' **Walcott lathe**, taper
18-36"x7-10' **Fay-Scott** Ext. Bed Gap **lathe**
24-24" Sliding Bed Gap 7-10' **Rahn-Larmon lathe**
14"x6' **Hendey, Yoke lathes**, cone (4)
14"x6' **Hendey** Grd. Head, **lathe**, M.D.
McCabe Dble Spindle 26-48"x14' **lathe**
L & S. 14x6', 16x6', 16"x8', 30x10 Grd. Hd. and cone **lathes**
26"x18' **Putnam**, M.D. **lathe**, taper
Niles 2½" **Boring Mill**
Binsee 3", 4" **Boring Mill**
Rockford 3" **Boring Mill**
Bullard 36" **Vertical Boring Mill**
Bullard 24" **Vertical Turret**, S.P.D.
G. & E. 12" **Gear Hobbers** (3)
S. & S. 10", 14, 18" **Gear Hobbers**
Waltham 4" pinion **Cutter**
Barber-Colman No. 3, 3 **Gear Hobbers**
B. & S., 3—26", 4—36" **Gear Cutters**
No. 6 **Fellows Gear Haper**
Bryant No. 6 **Internal Grinder**
Diamond No. 3—36" **Grinder**, M.D.
Landis No. 3 **Universal Grinder**
Brown & Sharpe No. 12 Cyl. **Grinder**, S.P.D.
Heald Internal No. 55, 60, 65
Landis 20x72", **Plain Grinder**
Abrasive No. 33 **Grinder**, M.D.
Churchill-Morgan Internal Grinder
Walker 10" **Rotary Surface Grinder**
Heald 8" **Rotary Surface Grinder**
B. & S. No. 11, 2 **Universal Grinders**
Persons-Arter 8" **Rotary Surface Grinder**
Landis 10x36" **Self-Contained Grinder**
Modern 12x24", 12x48" **Self-contained Grinders**, M.D.
P. & W. 12" **Vertical Surface Grinder**
Greenfield No. 51 **Hydroil Internal Grinder**
Fraser 10x36" **Cylindrical Grinder**

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2—#3½ L LaPointe Hydraulic Broaches (new)
2—24" Steinle Turret Lathes
2—3B Foster Turret Lathes
1—2" x 24" Jones and Lamson Turret Lathe
1—3" x 36" Jones and Lamson Turret Lathe
1—28" Gisholt Turret Lathe
2—24" Gisholt Turret Lathe
1—28" x 10' New Haven Engine Lathe
1—17" x 6' Le Blond Engine Lathe
1—17" x 8' Le Blond Production Lathe
4—25" x 12' Le Blond Heavy Duty GH Production Lathes
2—25" x 14' Le Blond Heavy Duty GH Production Lathes
3—No. 2 Warner and Swasey Turret Lathes
1—14" x 6' Reed Prentice Geared Head Lathes
1—14" x 19" Fay Automatic Lathe
1—36" Cincinnati Horizontal Borer
1—3¾" Barrett Horizontal Boring Mill
1—Harnischfeger Horizontal Drill and Borer
1—Coulter Vertical 2 spindle Diamond Borer
1—4" Niles Horizontal Boring Mill
1—24" x 24" x 6' Ingersoll Slab Mill
1—#1½ Cincinnati Plain Mill
1—#2 Cincinnati Plain Mill
1—#3 Becker Plain Mill
1—2½' Dreses Radial Drill
1—2½' American Radial Drill
1—2½' Mueller Radial Drill
1—5' Niles Radial Drill

1—36" Fellows Gear Shaper
1—D2 Colburn Drill
1—18" Gleason Gear Generator
1—5A Lees Bradner Gear Hobber
1—No. 12 Barber Colman Hobber
1—20" Rockford Shaper
1—16" Hendey Shaper
1—#2 Bath Universal Grinder
1—No. 16A Blanchard Grinder
2—No. 65 Heald Grinders
1—No. 14 Brown and Sharpe Grinder
1—16" x 60" Modern Plain Grinder
1—Springfield Planer Type Grinder
1—Greenfield Cutter Grinder
1—#1F Norton Lapper
1—4" Ajax Upsetter
1—#0 Ajax Forging Roll
1—1" Ajax Hot Headers
1—48" x 48" x 16' Pond Planer
1—100,000# Riehle Testing Machine
2—275 Ton Hydraulic Presses, 4 post type
1—Shepard Pinch Bug Riveter
1—Williams and White 48" x 11/16" Shear
1—#3 Ryerson Friction Saw
1—4½" Model H Gridley Chucking Machine
1—24" Niles Slotter
1—2A High Speed Hammer
1—3 Spindle Gleason Rougher
1—36" x 30" x 22' Ingersoll Miller

MACHINE TOOLS
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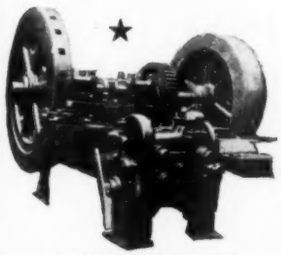
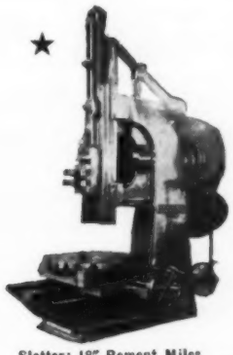


Header: Waterbury-Farrel 1½" Capacity Ball.

No. 44 Productomatic Miller.



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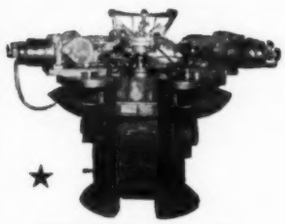

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Milwaukee No. 3 Standard Vertical, with 21" power feed Rotary Table. All feeds.

Slab Miller: Niles 36" Horizontal

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AIR COMPRESSORS
12 x 10 I-R, class ER 1.
12 x 10 Sullivan W.G. 6.
7 x 6 I-R, class ER 1.

CRANES
3-ton Gantry 40-ft. span.
3-ton Overhead 40-ft. span.

DRILL PRESSES
#3 Bausch 30-spindle Highspeed.
#2 Colburn Heavy Duty Mfrg.

GRINDERS
#1 Cincinnati Tool & Cutter.
12 x 36 Modern Cylindrical, self-contained, with motor.

GEAR MACHINERY
3 Brown & Sharpe Gear Cutter.
1 Cross Gear Tooth Rounder.
#61 Fellows Gear Shaper.

LATHES
Niles-Bement-Pond Axle Turning.
20" x 8-ft. Hendey, quick change.
16" x 8-ft. Monarch quick change.
14" x 6-ft. LeBlond, quick change.
12" x 5-ft. Hendey, quick change.

MILLING MACHINES
Garvin, 30 x 6 working surface.
U. S. hand type, 4" x 23" table.

NUT TAPPERS
½" National Bent Tap.

PRESSES
#21 Bliss Geared, 5" stroke.
P-21 Ferracute, 20" throat.
#4 R & K, 2½" stroke.
#204-E Toledo, 2½" stroke.
#4 Consolidated Geared, 2½" stroke.

ROLLS
Plate Rolls 8 ft. x 5½" dia.
Corrugated Rolls, 32"; drop end.

SHAPERS
24" Hendey; 24" Potter-Johnson; 20" American; 16" Milwaukee; 26" G&E; 18" Hendey; 14" Steptoe.

SHEARS
50" x 7-gauge Bertsch Squaring.
8-ft., 10-gauge Power Squaring.

WELDERS
25 KW Thompson; 10 KW Toledo; 20 KW Toledo; American B.W. 16.

THE ELYRIA BELTING and MACHINERY COMPANY
ELYRIA OHIO

Air Comp., 8x8" Ing-Rand, Tank.
Air Comp., 12x10" Bessemer 232 CFM, B.D.
Bolt Threader, 1½" Landis, Sgl. Hd, lead screw, motor of 3/60/220 Volts.
Buffers, 5 HP, B&D. Hvy. Duty, 110 V. DC. 2400 rpm. (2)
Drill, Dbl. End, Natco, Horiz., type S-S.
Electric Furnace, 1000 lb. Swindell-Dressler, with transformers.
Engine Generator Set, 22½ KW. Wghse, 125 V. DC. Gas Engine.
Filing Machine, #2 Cochrane-Bly, belt drive.
Grinder, Disc, #26 Besley, Dbl. Opposed, B.D.
Grinder, Internal, #23 Baxter, 17" spindle.
Grinder, Surface, #1 Diamond, Mag. Chuck, M.D.
Grinder, Surface, 12" P. & W., chuck, M.D.
Hammer, Steam Drop, 1000 lb. Chambersburg.
Hammer, 100 lb. Bradley "Compact," Motor 3/60.
Hammer, 300 lb. Bradley Upright Helve, M.D.
Hammer, 300 lb. Chbg S.F. Steam or Air.
Hammers, S.F. Steam or Air, 1100, 1500 & 2000 lbs.
Hoist, Chain, 3-Ton Superior Triple Geared.
Lathes, Bench, Rivett #505, compound slide, draw-in att., collets, belt drive. (4).
Lathes, Bench, 8x30" Ames, collets, thread. at.
Motor, 10 HP. C-W. 230 V. DC. 1400 Rev., starter. (new).
Pipe Machine, 6" Landis, Motor 3/60. (modern).
Planer, Crank, 20x20x24, Cincinnati, 1-Hd, B.D.

PRESS, Hydraulic, 250-Ton, 4-posts, platen 148"x52", daylight 108", stroke 40", water pres. 2500#. Wt. 130,000 lbs. Near new. (2)

Press, Punch type, Wells, stroke 1½". Wt. 2500 lbs.
Press, Punch or Horn type, #116 Niagara Geared, str. 1½". M.D.
Press #6 Niagara O.B.I. 3" stroke.
Reaming Mach., Horiz. 2-Delta Opposed Hds. with two Motors ¾ HP. 1/60/110 Volts.
Riveter, 2-A. High Speed, for M.D.
Rotary Slitter, 36" Yoder, cap. 5 cuts 11 ga., M.D.
Sand Blast, McCloud, B-5666, barrel 48x42", B.D.
Sand Blast, Pangborn GD., #3, with bucket conveyor.
Sand Blast, Pangborn AU-3, equipment. (near new).
Shear, 30" Niagara Power Squar., cap. 22 ga.
Tapping Mach., 2" Acme 6-spdl. semi-auto. with motor.
Threading Mach. Auto., 2" Rickert-Shafrt, Boring & Chamfering tools, M.D.
Thread Miller, Smalley General 12x 36". M.D.
Welders, Butt, 200 & 300 KW. Winfield 60 cy., 440 V.
Welders, Steam, 125 KVA, Thompson, 60 cy., 220 volts.

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GRINDERS
1—#14 Brown & Sharpe (10 x 18") Heavy duty plain cylindrical grinder 3 motor drive, all automatic feeds, very modern tool, for wheel up to 22" x 3"
2—12 x 36" Cincinnati Plain Cylindrical Grinders, 3 motor drive, largest dia. of wheel 18"
1—#22 Heald rotary surface grinder, 9" dia. magnetic chuck
1—Arter Rotary surface grinder 8½" chuck, very modern tool
2—#80 Heald internal grinders, all power feeds, belt drive
1—#6 Besley ring wheel grinder, dia. wheels 18", width of table 6"
1—16" x 48" Cincinnati Universal Grinder, 3 motor drives

TURET LATHES
1—3½" x 26" double spindle Jones & Lamson flat turret lathe, with chucks & tools
1—3 x 36" single spindle Jones & Lamson turret lathe, arranged for bar work, with complete set of tools

MILLING MACHINES
1—model CS Becker vertical rotary mill, s.p.d., dia. of circular table 28½"
1—#3V Toledo vertical mill, s.p.d., all geared speeds and feeds, table 56" x 14", range 46" x 14" x 16", with power rapid traverse

LATHES
3—9" Porter Cable Manufacturing Lathes, s.p.d.
1—36" heavy duty Springfield engine lathe, max. distance between centers, 8' 6"
1—12" x 4' Hendy lathe

GEAR MACHINERY
1—#5 Lees Bradner gear generator, max. dia. of gear 4" in steel, in cast iron 8"

PLANER
1—36" x 36" x 10' Niles Planer, four heads, belt drive
1—36" x 36" x 8' Woodward & Powell planer, two heads on rail

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OTT MACHINERY SPECIALS

AUTOMATICS

Acme, #56 2¼", 4 spdle.
Brown & Sharpe #00 Cut-off
Cleveland 1¼, 2 & 2½" Model B.
Cleveland 3¼" Model A, M.D.
Gridley 2¼, 3¼ & 4¼" S.S.
Automatic Threading Lathe, 13" x 6" Coulter, G.H.
New Britain No. 22

Cleveland, 4½" Model M Chucker, M.D., 4 spdle.

BORING MILLS

42" Bullard, 2 swivel heads.
54" Niles, 2 swivel heads.
Barrett Horizontal, 5" diameter Bar x 14' long.

DRILLS

Cincinnati, 21" Direct Drive, M.D.
Edlund No. 1A 4-Spdle., P.F. No. 3 M.T.
Henry & Wright, 1 to 8 spdle. No. 2 M.T.
Natco & Baush Multiple spdle.
Morris, 4' Plain Radial.

GEAR MACHINERY

Nos. 3 & 12 Barber-Colman Hobr.
No. 6 Fellows Shaper.

GRINDERS

Nos. 11, 12 & 16 Brown & Sharpe.
Landis, 10x36" Self-Contained.
Norton 16"x36" Crankshaft.
Norton 10x24" Plain & 36".
Nos. 2 & 3 Brown & Sharpe Universal.

LATHES

Hendey 14"x5' & 18"x10'.
14"x6' Monarch, M.D.
Sundstrand Stub, 8", M.D.
3x36" Jones & Lamson, M.D.

Lapper, No. 15 Norton M.D.

MILLING MACHINES

Cincinnati No. 2 Plain.
Becker Vertical Model C.S. 30" Rotary Table.
Becker Vertical, No. 4B.
#3B Brown & Sharpe with Vertical Attachment, M.D.

PRESSES

PG2, P3 & 4, Ferracute, Solid Back.
No. 68N Bliss Double Action.
No. 94 Bliss, Solid Back.
No. 34 Toledo, Solid Back, S.G.
No. 77B Niagara, Bble. Crank, S.G.

PLANERS

26"x26"x5' Gray, 1 Head, M.D.
44"x44"x18' Niles, 4 Heads.

30"x30"x8' Cincinnati, 1 Head, M.D.

PROFILERS

No. 13 Pratt & Whitney S.S.

RIVETERS

No. 1½B, 2 & 3A, & 5½B High Speed.
No. 6 Whiting Stake, 32" throat, 8" Stake.

ROLLS & SHEARS

No. 7 Bertsch, 6½" Rolls, 6'x¼" Capacity, M.D.
No. 296 Robinson, 8'x No. 14 gauge, M.D.

SHAPERS

16" & 20" Gould & Eberhardt, M.D.

TAPPERS

Nos. 1, 2 & 2X Garvin.
Webster & Parks, 5 spdle. vertical.

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AUTOMATICS
- No. 2G Brown & Sharpe
- ¾" Model F Gridley, four spindle
- 1¼" Model F Gridley, four spindle
- 1¾" Model F Gridley, four spindle
- 2¼" Model F Gridley, four spindle

BROACHES
- No. 3 LaPointe

DRILLS
- 3' Cincinnati Bickford radial
- No. 2 Colburn, single spindle
- 24" Barnes, power feed
- No. 12 Natco Multiple Spindle
- No. 13 Natco Multiple Spindle
- Three Way Natco Horizontal Multiple Spindle

GEAR CUTTERS
- No. 10 Lees-Bradner Gear Grinder
- 15" Gleason Spiral Bevel Generator
- 18" Gleason Gear Tester

GRINDERS
- No. 70 Heald Internal
- No. 55 Heald Internal
- No. 60 Heald Internal
- 22"x84" Pratt & Whitney Surface
- 10"x20" Landis Cylindrical
- 18"x96" Brown & Sharpe Cylindrical
- 16"x50" Norton Crankshaft
- 20A Bellvue Drill
- Ingersoll Cutter, Tub Type

LATHES
- 14"x6' Monarch, c.d.
- 16"x6' Lodge & Shipley, c.d.
- 16"x8' American, q.h.
- 18"x8' Monarch, c.d.
- 21"x8' LeBlond, c.d.
- 18/36"x12' Rahn Larmon Extension Bed Gap
- No. 9 LeBlond Multicut
- 9" Sundstrand Manufacturing
- 3½x60" Fitchburg Lo-Swing, q.h.
- 8"x"60" Fitchburg Lo-Swing, q.h.
- 18"x7' Chard Production, c.d.

TURRET LATHES
- No. 1B Foster
- Model C 26" Libby 7½" hole
- No. 2A Warner & Swasey
- No. 1 Warner & Swasey
- No. 4 Warner & Swasey
- No. 7 Bardons & Oliver
- No. 9 Bardons & Oliver
- 2¼x24 Jones & Lamson
- No. 6A Potter & Johnston Automatic

MILLS, BORING
- 52" Gisholt vertical, m.d., power rapid traverse

MILLS, PLAIN
- No. 4B Kearney & Trecker, double over-arm, spd.
- No. 3B Kearney & Trecker, spd.
- No. 3 Cincinnati, c.d.
- No. 3 Cincinnati, s.p.d.
- No. 14A Garvin, c.d.

MILLS, UNIVERSAL
- No. 2 Cincinnati, s.p.d.
- No. 2A Garvin, c.d.

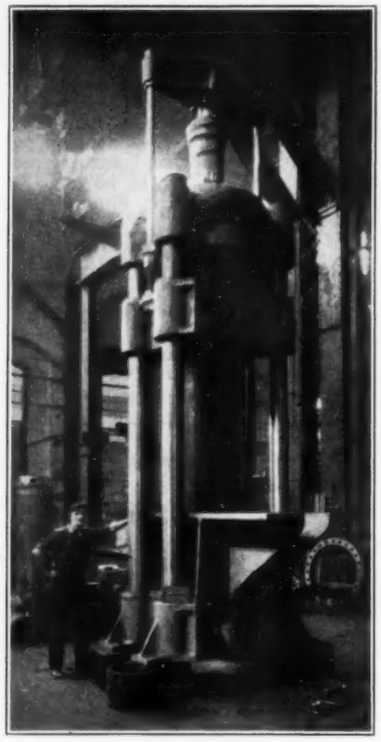
MILLS, VERTICAL
- No. AB Becker, c.d.
- No. 4B Becker, c.d.

PLANERS
- 26"x26"x8' Gray
- 30"x30"x8' Cincinnati
- 33"x33"x10' Cincinnati
- 36"x36"x12" Woodward & Powell

SAWS
- No. 4 Atkins Band, m.d.
- No. 12 Higley Cold Cut
- No. 6 Nutter & Barnes

SHAPERS
- 16" Hamilton, c.d.
- 20" Cincinnati, c.d.
- 24" Cincinnati, c.d.
- 24" Cincinnati, s.p.d.
- 28" American, s.p.d.

INDIANAPOLIS MACHINERY & SUPPLY CO., INC.
1959-69 South Meridian Street
INDIANAPOLIS, INDIANA
Eastern Branch:
44 WHITEHALL STREET, NEW YORK, N. Y.



SOUTHWARK 760-TON HYDRAULIC PRESS

Write—Wire—Phone

SPECIAL OFFERINGS

1—Southwark Single Opening Hydraulic Press, 29" Diameter x 20" Stroke Down Moving Ram, 2—15" Diameter x 20" Stroke Pullbacks, Platen size 44¾" Left to Right x 49" Front to Back, 96" Daylight Opening, All Steel Construction throughout. General Arrangement of Machine as Shown in Photograph with the Exception that the Press is Fitted with Two Pullback Cylinders. Machine in Excellent Condition, and Complete with Necessary Operating Valves and Piping.

1—8-Opening Hydraulic Press, Fitted with 9—30" x 52" x 2" Steel Steam Platens, 3" Openings, 2—14" Diameter, 23" Stroke Outside Packed Rams, 2500 lb. WP, Full Set of Steam Swing Joints and Platen Hangers, Pneumatic Lift Table on Each Side of the Press, Complete with Four-Plunger Vertical Hydraulic Pump, 1" x 2½", with Safety Relief Valve and 15 HP AC Motor, and All other Necessary Operating Valves, Piping, Fittings, etc., to Make a Complete Self-Contained Hydraulic Unit, in Excellent Condition Throughout.

All Equipment Ready for Immediate Shipment.

Full line of Hydraulic Pumps, Presses, and Accumulators; Machine Tools, Motors, etc.

INDUSTRIAL EQUIPMENT COMPANY
856 Broad Street, Newark, N. J.

For Immediate Delivery:

Ridgeway 74"x74"x32' Planer perfect condition.
Universal Milling Machine: No. 1½ Cincinnati.
Universal Milling Machine: No. 2 Cincinnati.
Universal Milling Machine: No. 4 Cincinnati.
Milling Machine: No. 3 Cincinnati Plain.
Milling Machine: No. 4 Becker Vertical.
Turret Lathes: No. 2 Warner & Swasey (3).
Turret Lathe: No. 3 Warner & Swasey.
Turret Lathe: No. 6 Warner & Swasey.
Turret Lathe: No. 4.
Lathe: 18" x 8' Monarch, Q.C., back geared.
Lathe: 16" x 6' Hendey, Q.C., yoke head.
Lathe: 16" x 10' Whitcomb Blaisdell, Q.C.
Engine Lathe: 12" x 6' W. C. Young, B.G., Q.C.
Lathe: 15" x 6' Greaves Klausman, B.G., Q.C.
Lathe: 14" x 6' Flather, B.G., Q.C.
Radial Drill: 4' Universal.
Press: Power, Bliss No. 0, Stiles, C.B.
Press: Power, Bliss No. 4, Stiles, C.B.
Shapers: 24", 20", 16", G. & E.
Shaper: 20" Steptoe.
Cy. Grinders: No. 3 Modern Universal (8).
Universal Grinder: No. 2 Bath.
Gear Cutter: No. 6 Brown & Sharpe 60".

RECONSTRUCTION MACHINE TOOL CORPORATION
11 Broadway 99 Lafayette St.
New York City
Whitehall 3-7518 Worth 4-5864

- No. 3 Acme Universal Turret Lathe. Grd Head. Arranged for Chucking.
- 21" Model H Gisholt Turret Lathe.
- 14 ga x 8' OHL power Squaring Shear.
- 4 & 6 Spindle Avery Sensitive Drills No. 2 M.T., B.B.
- No. 1B, No. 2B Edlund, 2 Spindle Sensitive Drills
- 16"x66" Landis Universal Grinder. Overhead belt drive
- 24"x24" Ohio Planer, 1 head, belted moto. drive.
- 18"x9' Chard Lathe semi quick change cone.
- 10' Robinson Toggle Type Press Brake
- No. 12, 13 Natco Drills

IROQUOIS MACHINERY CO.
662 Ohio St. Buffalo, N. Y.

MISCELLANEOUS MACHINES

#3 Barrett 6" bar Cylinder Boring Machine
Rockford Dbl. End Hydraulic Boring Machine
24"x14' bed Schumacher-Boye Lathe, rebuilt
2" Landis Dbl. Spdl. Bolt Cutter
3" Landis Single Spdl. Bolt Cutter
36"x30x20' Whitcomb Planer, 2 heads
30x30x8' Gray Planer, 2 hds.
#40 NATCO Straight Line Multiple Drill
#60 NATCO 3-way Multiple Drill
No. 14 NATCO Multiple M.D. Bored 22 Spdls.
Rockford Sgl. End. Hydraulic Boring Unit, with 2-sta. 54" dia. table
C-13H NATCO Hydraulic, m.d.
No. 14 NATCO Multiple with 12 spdls.

THE STRONG, CARLISLE & HAMMOND CO.
1392 West 3rd St., Cleveland, Ohio
2832 E. Grand Blvd., Detroit, Mich.

8' x ¼" ROBINSON PRESS BRAKE
Die space 14". Face of ram 8' 4" x 6'
Equipped with tie rods
J. L. LUCAS & SON, INC.
BRIDGEPORT, CONNECTICUT

IN STOCK . . . . FOR PROMPT DELIVERY

Grinders

#14 Brown & Sharpe Plain
#29 Beasley 53" diameter disc
1½ Cinn Tool & Cutter
84-A Gardner Double Opposed disc

Milling Machines

40" Ohio Tilted Rotary M.D.
28" Cinn Duplex
#12 Brown & Sharpe Mfg.

Drills

#3 Aveymatic S.S. & P.F.-M.D.
24" Cinn Mfg. Type M.D.
2 Spindle Sipp #2 Morse
Natco Multiple Spindles all sizes

Miscellaneous

15 & 30 Ton Lucas Forcing Press
#6 Fellows Gear Shaper
12' 12 Gauge Dreis & Drump Brake leaf type
#3 Canton Alligator Shear
#45 E.A.T. Pels Coping
36"x36"x12' Pond Planer 2 heads on rail
1¼x1½ Model B. Cleveland Automatic
#OOG Brown & Sharpe Full Automatic
20 Ton Fox Press with straightening fixture
9"x24" Sundstrand Lathe M.D.
#1 & #2 Warner & Swasey & Foster Hand Turret Lathes
1¾" 4 Spindle Model F Gridley (2)

GET IN TOUCH WITH US IF THE UNIT YOU NEED IS NOT ON THIS LIST

INTERNATIONAL MACHINERY CO.
3131 E. JEFFERSON AVE. DETROIT, MICHIGAN

SPECIAL

1—#10 two stage **INGERSOL-RAND IMPERIAL AIR COMPRESSOR**—800 cu. ft. displacement—intercooler — Westinghouse slip ring motor, starter and McCord oiler over capacity tank.

1—4' **FOSDICK RADIAL DRILL**—gear box drive.

1—#2 **COLBURN DRILL** 4 spindle

1—#3—36 spindle **BAUSH MULTIPLE DRILL.**

1—#2—48 spindle **BAUSH MULTIPLE DRILL.**

2—10 ton **HYDRAULIC PRESSES**—self contained.

1—Large **ACME** drum type **MILL.**

1—8 spindle **MOLINE HOL HOG HONE.**

MILLS-GAVAN MACHINERY SALES
3126 Grand River Detroit, Mich.
Temple 1-3148

WE OFFER

CINCINNATI UNIVERSAL GRINDER

12" x 72" Raised to 16"

Completely motor driven with Steady rests and Extra spindle. Guaranteed to grind to .0005. Motors standard 220-440 A.C. 60 Cycles Equal Brand New. Built 1931. Subject prior sale.

Also a wide variety of machine tools available

DO YOU HAVE 70 OR 75 HEALDS? LIKE THIS

We are equipped to change this type of unit over to hydraulic type at a nominal cost. Have recently made this change over on a number of machines for nationally known manufacturers engaged in War production.

MAY WE SERVE YOU?

For cost and delivery details contact as soon as possible.

BRADLEY MACHINERY COMPANY
211 JOS. CAMPAU DETROIT, MICHIGAN
Fi. 6375-6-7

SPECIAL SALE—THIS

$28.00 DEMAGNETIZER

at $12.50 Net

110 Volt. 60 Cycle, 600 Watt
Complete with Cord and Switch
Takes 4" Diameter Work Thru Hole

A REAL BARGAIN

Send Orders in While Our Stock Lasts.

DE WITT TOOL CO.

173 Grand St. **New York City**

SELECT Inland TOOLS

LATHES
20"x8' American
18"x16' Hendey
24"x12' South Bend
15"x7' South Bend
15"x8' South Bend
14"x6' Rockford
18"x10' Rahn-Larmon

DIE NIBBLER
Gray Roller, ¾" cap. 36" throat

GRINDERS
6"x18" Landis Plain Cyl. M. D.
12"x72" B. & S., plain Cyl. mtrzd.

PLANERS
26"x26"x8' Cincinnati, one head
24"x24"x6' Gray, one head

RADIAL DRILLS
4' Bickford, S.P.D., gear box
6' Bickford, cone drive

SHAPERS
16" Queen City
17" Averbeck
20" Hamilton

TURRET LATHES
No. 1 Foster
No. 2 Warner & Swasey
No. 2 Milholland
No. 2 Bardons & Oliver
No. 3 Foster
No. 9 Bardons & Oliver
3"x36" J&L Grd. Hd. Flat Tur. Lathe

AUTO. SCREW MACHINES
2" Cleveland, Model A
¾" Cleveland, Model A
⅝"-1½" Cleveland, Model A

MILLING MACHINES
6"x48" Pratt & Whitney Thrd. Miller
No. 3 Ohio Plain Milling Machine

INLAND MACHINERY CO.
48 So. Clinton St. **Chicago, Ill.**

1—12" raised to 18" x 80" **Cincinnati Universal Grinder,** Factory Motor Drive with AC, 3 phase, 60 cycle motors.

1—#4 **Brown & Sharpe Universal Grinder,** Complete.

1—12" **Heald Rotary Grinder,** Motor Drive.

1—14 x 6 **Hendey ECM Lathe,** 18 speeds, Motor Drive.

1—15" **Smith & Mills Shaper,** Motor Drive.

1—16" **Gould & Eberhardt Shaper,** Motor Drive.

1—2½' **Morris Radial Drill,** SPD through gear box.

1—#22SP **Pels Combination Punch & Shear.**

1—#4B **Milwaukee Double Overarm Plain Milling Machine,** Motor in Base, Rapid Traverse.

1—**Newton Planer Type Milling Machine.**

1—#3 **Cincinnati Vertical Milling Machine,** H.P., SPD.

Wiener Machinery Co., Inc.

237 Centre Street
NEW YORK, N. Y.

IMMEDIATE SHIPMENT
Rebuilt — Guaranteed

Blue Print Drying Machine, 42" Paragon
Bolt-Cutter, 1½" Landis Motor Drive
Flanging Machine, No. ½ McCabe
Gear Cutter, 36" Gould & Eberhardt
Grinder, Norton Plain Cylindrical 10" x 36"
Keyseater, No. 1 Davis
Lathes, 60" x 24', New Model Wright Field
Lathes, 32" x 12', Putnam
Lathes, 30" x 14', Davis
Lathes, 28" x 20', Schumacher Boye
Lathes, 26" x 48" x 18', McCabe 2 Spindle
Lathes, 24"x 10', Lodge & Shipley, Turret on shears
Lathes, 24" x 32', N. B. P.
Lathes, 18" x 8', Champion
Lathes, 16" x 5', Sidney
Lathes, 3—Putnam Speeds
Miller, No. 2 Shields High Power, single pulley
Miller, 48" Newton Continuous
Press, No. 74½ Bliss Geared Straight Side
Press, No. 1 Bliss Toggle
Saw, Robertson Hack Saw, 6" x 6"

FAILOR-STRAFER MACHINERY CO.
136 Liberty Street
New York, N. Y.

Air Compressor, 50 cu. ft., Allis-Chalmers, M.D
Bolt pointers (two), Economy ½"
Box Printer, single color, Hall & Brown
Broach, No. 2 Lapointe, 2 spindle
Chucks, 35—6' x 9" Heald magnetic
Chucks, 1—12" x 48" Heald magnetic
Drill, 4 spindle Demco, b.b., P.F. single pulley drive
Grinder, disc, No. 50 Gardner, m.d.
Grinder, disc, No. 50 Gardner, semi auto., with fixture for grinding edges of electric iron bottoms
Grinder, disc, No. 14 Gardner
Grinder, disc, No. 120 Gardner
Grinder, disc, 22" Gardner, m.d.
Millers (two), No. 12 B. & S.
Pipe threader, 4" Bignell Keeler
Pipe threader, 2" Oster
Planer, 36 x 36 x 10 Woodward & Powell, 1 head on rail
Plate, polisher, No. 27L Excelsior, m.d.
Press, No. 1 Bliss cam drawing, s.s.
Press, No. P2 Ferracute
Press, No. 65 Consolidated, s.s., flywheel type
No. O-36 **Unishear,** m.d., less motor
Manville four slide, hand feed, cap ¼ x 1
Tappers, vertical (two), 5 spindle Webster & Perks
Tapper, No. 2 Garvin
Tappers (two), ⅝" Rickert Schafer
Thread roller, ⅝ Waterbury

D. H. Prutton Machinery & Tool Co.

5295 West 130th St. **Cleveland, O.**

SPECIAL OFFERINGS

#36-B **Gould & Eberhardt Automatic Gear Cutter** for spur and bevel gears
#615 **Fellows Gear Shapers** (2)
Model "B" 14" **Pratt & Whitney Vertical Surface Grinder,** motor driven
#4 Type B **Diamond Automatic Surface Grinder** with 13"x62" magnetic chuck, motor driven
48"x48"x12" **Pond Planer,** two heads
122"x122" **Corliss Planer,** table 26' long x 9' wide, two heads
20" **Columbia Shaper,** motor driven
#½ **Van Norman Duplex Milling Machine**
#314 **Baker Heavy Duty Drill,** 3" capacity
#321 **Baker Heavy Duty Drill,** 3" capacity

Many others large and small What do you need?

WHAT HAVE YOU TO SELL?

HAZARD BROWNELL, Machine Tools

350 Waterman St. Providence, R. I.

REYNOLDS
MACHINERY CO.

NEW-USED-REBUILT
Machine Shop - Wood Working and Jewelers Machinery

AGENTS & DISPLAY ROOM

for South Bend Lathes
Delta "Quality" Tools
Dumore Grinders

Appraisers & Liquidators

WE BUY ENTIRE PLANTS

GA spee 5187
171 PINE ST. PROVIDENCE, R. I.

Used Machine Tools and the NATIONAL DEFENSE

A frank question:

Are we doing our part?
CAN WE DO MORE?

Mr. Machinery User:

This New Year of 1942 calls for a New Approach. A rough, straight-from-the-shoulder, honest-to-goodness looking into the mirror and a straight answer to the face-to-face question: *Is profit more important than our Country?*

Which shall it be:—*Selfish personal interest or the safe-guarding of our democracy for the younger generation?*

Don't let's kid ourselves. Before 1942 we were all thinking in terms of profit, in terms of self. *What about us?* Shall we continue our work thinking of profit first or shall we mend our ways, forget profit and think of country first?

MACHINERY IS NEEDED FOR THIS NECESSARY WAR PROGRAM.

This is where YOU can render help, vital help.

Go, NOW, TODAY, make a careful survey of your production and tool room facilities:

List the machines you don't use at all
List the machines you use a little
List the machines which are duplicates of facilities in other departments

OFFER THESE MACHINES FOR USE BY INDUSTRIES WORKING ON GOVERNMENT CONTRACTS.

I don't care whether you offer these machines to Hasco Machinery Co., of Newark, N. J., or to any other dealer, or direct to the government. Profit is the least important thing in this matter. The machines are important; their productive facilities are important.

PRODUCTION WILL WIN THIS WAR! Production of non-profit, death dealing items. Production which means sacrifice of the things we are used to, yes even the things we need. Sacrifice of profits, sacrifice of luxuries, sacrifice of self. Any faker can beat his breast in public and say, "I am patriotic", but to hell with that, let's get down to earth. Let's recognize the real needs, self-sacrifice for nation; sacrifice without glory, without praise, without medals. Yes, private sacrifice known only to our souls.

So, let's get going in 1942. Get rid of the machines which you don't need but which are essential to others in the program of production of tanks, ships, planes, bullets and bombs.

Herbert I. Segal, Gen'l. Mgr.
HASCO MACHINERY CO.
Newark, New Jersery

MACHINES VITALLY NEEDED IN THE GOVERNMENT DEFENSE WORK:

Milling Machines of all types
Boring Mills, Horizontal & Vertical
Screw Machines, single & multiple spindle
Turret Lathes, the small hand and the larger
Radial Drills; Grinders
Planers, Planers, Planers, especially larger.
Lathes from small tool room to large gun turning
Grinders of all types

Offer these surplus machines to

HASCO MACHINERY CO., NEWARK, N. J.

or to any other dealer.

ReMANUFACTURED MACHINE TOOLS
-(ORIGINATED BY US)-

BORING MACHINES
No. 2—5" Bar Barrett

BORING MILLS
42" Gisholt

DRILLS
1, 2, 4 spdl. Henry & Wright
1, 2, 4 spdl. Leland-Gifford
No. 2—6 spdl. Leland
No. 2—1 spdl. Colburn
No. 2—4 spdl. Colburn
No. 5-D—4 spdl. Moline Hole Hog
No. 17—2 Spdl. Foote-Burt Rail
No. 4—5 spdl. Foote-Burt Rail
No. 1 Baush Multiple
No. 3 Baush Multiple

RADIALS
5' Western Heavy
8' Western Heavy

GEAR CUTTERS
No. 6, 61, 62, Fellows
No. 12 Barber-Colman
No. ½ Pfauter Hobber, M.D.
No. 3—26" Brown & Sharpe
No. 4—48" Brown & Sharpe
No. 5—48" Brown & Sharpe
No. 6—72" Brown & Sharpe
No. 6-A—72" Cincinnati
96" Newton Spur Gear
No. 36BM G&E Bevel Rougher

GRINDERS
(See page 409 special advertisement Hill-Clarke Cylindrical Grinders)
No. 40 Bryant Plain, Wide Wheel, Oscillating
No. 2½ Universal (Bath Type)
No. 5 Springfield Planer Type Surface
No. 2—18" Gardner Disc

LATHES
3½"x36" Fitchburg Lo-Swing
3½"x60" Fitchburg Lo-Swing
3½"x108" Fitchburg Lo-Swing
8"x60" Fitchburg Lo-Swing
No. 4 AC Leblond Auto. Duplex Crankshaft
18"x6' Bradford Geared Head
20"—40"x10' Rahn-Larmon Geared Head Sliding Bed Gap
21"x8' LeBlond Universal
21"x10' LeBlond
24"x22' Lodge & Shipley, taper attachment
26"x10' Bridgeford
30"x12' Whitcomb-Blaisdell
50"x18' Schumacher & Boye

MILLERS
No. 3 Becker-Brainard Plain Miller
Model CS Becker Vertical Continuous Rotary
5" P&W Automatic
60"x56"x8' Beaman & Smith Duplex
24"x24"x12' Ingersoll Adj. Rail
24"x20' Ingersoll Dbl. Faced
36"x36"x12' Newton Duplex
38"x44"x20' Ingersoll Slab
No. 1 Smalley-General Thread

PLANERS & SHAPERS
24" Mark Flather, S.P.D. Shaper
24"x24"x6' Powell
24"x24"x6' Rockford
24"x24"x12' Gray
30"x30"x8' American
30"x30"x8' Powell
36"x36"x12' American
36"x36"x18' Cincinnati
42"x42"x14' Gray
48"x48"x10' Niles-Bement-Pond
48"x48"x12' Gray, Reversing M.D.

PRESSES
No. 303 Bliss Straight Sided
No. 58 Toledo Nosing
No. 42½ Pels Beam Shear

TURRET LATHES
21"x8' LeBlond Universal
2¼"x26" Greenlee, A.C. & B.F.
3¼"x40" Greenlee
3"x36" Jones & Lamson, 2 spdl.
3"x36" Pratt & Whitney, A.C. & B.F.
21" Gisholt, 3¾" H.S.
24" Steinle, 6¼" H.S.

MISCELLANEOUS
60" Quickwork Rotary Shear
No. 4 J. N. La Pointe Broach
6½" Avey Metal Band Saw
No. 12 Bignall & Keeler Pipe Machine

HILL-CLARKE MACHINERY COMPANY
651 Washington Blvd. Chicago

REBUILT MACHINE TOOLS

BORING MILLS

14' Sellers, P.R.T., 2 hds., M.D.
72" Niles, 2 hds., M.D.
60" Betts, 2 hds., M.D.
Niles Horiz. Cyl. Boring & Facing Mach. with 7" & 12" bars, 45,000#.
6" bar #3 Barrett, M.D.
4—⅝" bar N.B.P. Knee Type M.D.

DRILLS

5' & 6' Cinci. Bickfords, M.D. (2)
36" Cinci. Bickford Upright.
#13 P. & W. Multi, 13 spin.
#13 Natco Multi, 19 spin.
#11 Natco Multi, 6 spin.
6, 5 & 4 spin. Allens.
1 spin. Avey #2, 7½".

GRINDERS

10"x6"x36" Norton Planer Type Surface, M.D. Mag. Chuck.
Landis Cylindrical Grinders: 30"x240", 24"x96", 20"x96", 16"x68" Crankshaft, 6"x20".

LATHES

42"x32' Pond.
36"x25' Pond, 2 carr., Tri. Grd.
36"x16' Putnam Tri. Grd.
26"/48"x12' Harrington Gap.
26"x15' N.B.P., Q.C.G., T.A.
25"/50"x14' LeBlond Gap, Grd. Hd.
24"x12' Putnam T.A., M.D.
22"x20' L. & S., Q.C.G., Cone.
21"x8' Ryerson Conradson, Grd. Hd.
19"x12' LeBlond, Grd. Hd., T.A.
14"x8' Hendey, T.A. M.D.
30"x28' N.B.P. Gun Boring.

TURRET LATHES

28" & 24" Steinles, 8¼" & 6¼" H.S.
J. & L. two spindle Turret
2½"x26" P. & W. Grd. Hd.
#6 Brown & Sharpe Screw.

MISCELLANEOUS

60"x60"x30' Gray Planer.
42"x42"x16' N.B.P. Planer.
36"x36"x12' D. & H. Openside.
20'-24" Dill Slotter, M.D.
19", 16" & 10" Slotters.
⅝"—¾" Cleveland Model A Automatic
1" Landis Dble. Hd. Bolt Threader M.D.
No. 6 Fellows Gear Shaper, M.D.
Nos. 2 & 3 P. & W. Die Sinkers.
Nos. 1 & 3 Baker Keyseaters.

BENNETT & RAFKIN CO.

30 Church Street — New York City

LATHES

14"x 6' Rockford
14"x 8' American
16"x 8' American
18"x10' Mueller
26"x10' LeBlond, Universal Crankshaft

MILLING MACHINES

4½"x12" Pratt & Whitney Thread Miller
No. 0 Brown & Sharpe Plain
Standard Hand Millers, M.D. (2)
2" Pratt & Whitney spline (duplex)
No. 2 Brown & Sharpe, Vertical

BORING MILLS

51" Bullard, Vertical, 2 Heads

GRINDERS

14"x36" LeBlond Multipurpose, 3 Motors

TURRET LATHES

Goss & De Leeuw Chucking, 6"x6½"
2 Spindle J&L Steel Head
3¼"x36" Acme flat Turret

GEAR MACHINERY

No. 65 Fellows Gear Shaper
No. 61 Fellows Gear Shaper, M.D.
No. 712 Fellows Gear Shaper, M.D. (2)
No. 4—48" Brown & Sharpe Gear Cutter
Lees Bradner Gear Grinders (2)

MISCELLANEOUS

No. 1 Foote-Burt Duplex Surface Broach
8" Weiland Standard Pipe Machine
No. 4 Hilles & Jones Double End Punch and Shear
2" Acme Bolt Threader
7' Dreses Radial 17" Column
No. B-16 Natco Multiple Spindle Drill
No. 1 Baker Keyseater
30" Morton Draw Cut Shaper, M.D.
14" Gould & Eberhardt Shaper
No. 27 Beloit Splitting Shear

WIGGLESWORTH MACHINERY COMPANY
203 Bent St., Cambridge, Mass.

MACHINE TOOLS
for
PROMPT SHIPMENT

Bridgeport (Bullard) 48" Boring Mill, 2 heads.
(2) Landis 10x24" Plain Cylindrical Grinder, self contained.
Landis No. 2 Universal Grinder, 12x32", complete equipment.
Landis 12x42" Plain Cylindrical Grinder.
Flather 20x12' Lathe, quick change gear.
American 24x12' Geared Head Lathe, quick change gear, taper att.
American 20x10' Geared Head Lathe, motor drive, pan bed.
Reed-Prentice 14x8' Geared Head Lathe, actual swing 17", arranged for motor drive, pan bed and taper attachment.
Southworth No. 2 Turret Lathe, wire feed, collets, etc.
Cincinnati No. 3 Universal Miller, arranged for motor drive, vertical att.
Osterlein 24x7½x18", Universal, dividing head, etc.
Woodward & Powell 30x30x8' Planer, motor driven, 2 heads.
Cincinnati 36x36x10' Planer, 2 heads on rail, 1 side head, motor driven.
Walcott 20" Crank Shaper, motor driven, back geared.
Whipp 20" Crank Shaper, motor driven, back geared.

HIGHEST PRICES PAID FOR GOOD SERVICEABLE MACHINE TOOLS
— WHAT HAVE YOU TO OFFER —

WRITE OR WIRE

JOSEPH BEAL & CO.
465 Atlantic Ave. — Boston, Mass.

NUTS & BOLT MACHINERY

#3—½ Waterbury-Farrel D88D Header
8—#3 Manville Auto. Bolt Head Trimmers
4—#375C Manville Auto. Bolt Head Trimmers
4—#4 Manville Auto. Bolt Head Trimmers
1—#500C Manville Auto. Bolt Head Trimmer

J. L. LUCAS & SON, INC.
BRIDGEPORT, CONNECTICUT

500# B & S Board Drop Hammer.
16"x12' Rahn & Larmon Lathe, Grd. Hd., T.A.
18"x12' Hendey Grd. Hd., T.A.
26"x18' Pittsburgh Lathe, B.D., T.A.
3-D Gisholt Simplimatic, M.D.
5' American Radial, Semi-Universal, B.D.
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39"x36"x12' Cin. Planer, 2 Heads
#59¼ Toledo Press 12" Stroke.
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Drill Presses: 28", 24" Hoefer; 25", 20", 40" Bement
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8" **Sundstrand** Stub Lathes.
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4 Spl. **Barnes** Camel Back Drill Press, Self-oiling.
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16" Kelley C. D.
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1	Shaw	5	52'	3-440-25cy.A.C.	Cab
1	Whitin	10	32'7"	Without Motor	
1	Alfred Box	15	33'	3-220V.D.C.	Cab
1	Maris	20	24'	Hand	
1	Case	20	45'2"	Hand	
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1	P & H	25	55'	4-220V.D.C.	
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P-173, American Machinist
330 West 42nd Street, New York City

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Equipment Wanted Advertising — Page 426

Where-to-buy Directory

This carefully revised and up-to-date Directory lists leading manufacturers of metal-working equipment, tools, accessories, materials and supplies. An asterisk before the company name indicates more detailed information is available in an advertisement in this issue. Keep this as a handy buying guide for 1942.

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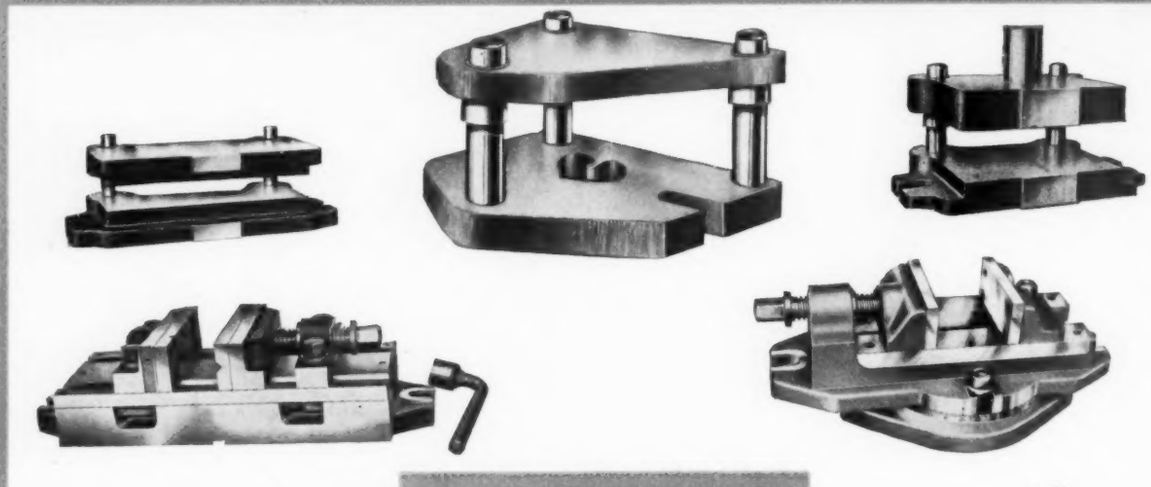

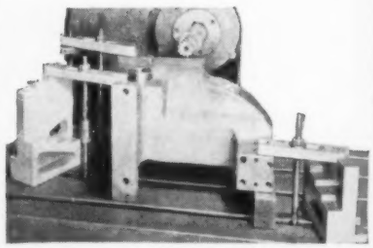

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* Van Dorn Iron Works, Cleveland
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New Jersey Zinc Co., N. Y. C.
Colonial Alloys Co., Philadelphia

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* Norma-Hoffmann Bearings Corp., Stamford, Conn.
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Formica Insulation Co., Cincinnati
Richardson Co., Lockland, Cincinnati
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Bound Brook Oilless Bearing Co., Bound Brook, N. J.
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* Johnson Bronz Co., New Castle, Pa.
Manhattan Rubber Mfg. Div., Passaic, N. J.
Moraine Products Div., General Motors Corp., Dayton, O.
Randall-Graphite Products Co., Chicago

BEARINGS, Roller
Ball & Roller Bearing Co., Danbury, Conn.
* Bantam Bearings Corp., South Bend, Ind.
* Bower Roller Bearing Co., Detroit
Consolidated Bearings Co., E. Orange, N. J.
Fafnir Bearing Co., New Britain, Conn.
Gwilliam Co., Brooklyn, N. Y.
Heim Co., Fairfield, Conn.
Hoover Ball & Bearing Co., Ann Arbor, Mich.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Link-Belt Co., Chicago
McGill Mfg. Co., Valparaiso, Ind.
* Norma-Hoffmann Bearings Corp., Stamford, Conn.
Orange Roller Bearing Co., Orange, N. J.
Roller Bearing Co. of America, Trenton, N. J.
Shafer Bearing Corp., Chicago
* S. K. F. Industries, Inc., Philadelphia
Split Ballbearing Corp., Lebanon, N. H.
* Timken Roller Bearing Co., Canton, O.

BEARINGS, Thrust
(See preceding classifications)

BELLOWS, Seamless Metal
Bridgeport Thermostat Co., Bridgeport, Conn.
Clifford Mfg. Co., Boston
Chicago Metal Hose Corp., Maywood, Ill.
Fulton Sylphon Co., Knoxville, Tenn.
Trane Co., La Crosse, Wis.

BELTING, Leather
Alexander Bros., Philadelphia
Bond Co., Chas., Philadelphia
Chicago Rawhide Mfg. Co., Chicago
Graton & Knight Co., Worcester, Mass.
* Greene, Tweed & Co., N. Y. C.
Houghton & Co., E. F. Philadelphia
National Leather Belting Co., N. Y. C.
Rhoads & Sons, J. E., Philadelphia
Warren Belting Co., Worcester, Mass.

BELTING, Metal Conveyor
Acme Steel Co., Chicago
Cambridge Wire Cloth Co., Cambridge, Md.
Link-Belt Co., Indianapolis
Sandvik Steel, Inc., N. Y. C.
Wickwire Spencer Steel Co., N. Y. C.

BELTING, Rubber & Fabric
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Continental Rubber Works, Erie, Pa.
Dayton Rubber Mfg. Co., Dayton, Ohio
du Pont, de Nemours & Co., E. I., Wilmington, Del.
Gates Rubber Co., Denver, Colo.
Gilmer Co., L. H., Tacony, Philadelphia
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Graton & Knight Co., Worcester, Mass.
Manhattan Rubber Mfg. Div., Passaic, N. J.
Manheim Mfg. & Belting Co., Manheim, Pa.
New York Belting & Packing Co., Passaic, N. J.
Republic Rubber Co., Youngstown, O.
Thermoid Rubber Div., Thermoid Co., Trenton, N. J.
U. S. Rubber Products, Inc., N. Y. C.

BELTS & BANDS, Abrasive
Armour Sand Paper Works, Chicago
Behr-Manning Corp., Troy, N. Y.
* Carborundum Co., Niagara Falls, N. Y.
* Clover Mfg. Co., Norwalk, Conn.
Dumore Co., Racine, Wis.
* Mid-West Abrasive Co., Detroit
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Norton Company, Worcester, Mass.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Walls Sales Corp., N. Y. C.

BELTS, "V"
Allis-Chalmers Mfg. Co., Milwaukee
Chicago Belting Co., Chicago.
Continental Rubber Works, Erie, Pa.
Dayton Rubber Mfg. Co. Dayton, O.
Dodge Mfg. Corp., Mishawaka, Ind.
du Pont de Nemours & Co., E. I., Wilmington, Del.
Firestone Tire & Rubber Co., Dayton, O.
Gates Rubber Co., Denver, Col.
Gilmer Co., L. H., Tacony, Philadelphia
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Manhattan Rubber Mfg. Div., Passaic, N. J.
Medart Co., St. Louis
Miller & Co., Carl A., N. Y. C.
New York Beltirg & Packing Co., Passaic, N. J.
Republic Rubber Co., Youngstown, O.
Rhoads & Sons, J. E., Philadelphia
Thermoid Rubber Div., Thermoid Co., Trenton, N. J.
U. S. Rubber Products, Inc., N. Y. C.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Pump & Machry. Corp., Harrison, N. J.

BENCHES, Shop
Aurora Equipt. Co., Aurora, Ill.
* Baumbach Mfg. Co., E. A., Chicago
Boice Crane Co., Toledo, O.
Challenge Machy. Co., Grand Haven, Mich.
Delta Mfg. Co., Milwaukee
Hardinge Brothers, Inc., Elmira, N. Y.
* Hill Acme Co., Cleveland
Lyon Metal Products, Inc., Aurora, Ill.
* New Britain-Gridley Mach. Div., New Britian, Conn.
Pollard Bros. Mfg. Co., Chicago
* Rivett Lathe & Grinders, Inc., Brighton, Boston
* Standard Pressed Steel Co., Jenkintown, Pa.
* Walker-Turner Co., Plainfield, N. J.
Western Tool Mfg. Co., Springfield, O.
Whitney Metal Tool Co., Rockford, Ill.

BENDERS, Hand
* Buffalo Forge Co., Buffalo
Dreis & Krump Mfg. Co., Chicago
Oneil-Irwin Mfg. Co., Minneapolis
Peck, Stow & Wilcox Co., Southington, Conn.
* Watson-Stillman Co., Roselle, N. J.

BENDING & STRAIGHTENING Machines
* Ajax Mfg. Co., Cleveland
American Foundry Equipment Co., Mishawaka, Ind.
Baldwin-Southwark Corp., Paschall, Philadelphia
Bath & Co., Cyril, Cleveland
Bertsch & Co., Cambridge City, Ind.
Birdsboro Steel Fdry. & Machy Co., Birdsboro, Pa.
Blackhawk Mfg. Co., Milwaukee
Bliss Co., E. W., Brooklyn, N. Y.
* Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
* Cincinnati Shaper Co., Hopple, Cincinnati
* Cleveland Punch & Shear Works, Cleveland
* Consolidated Machine Tool Corp., Rochester, N. Y.
Continental Roll & Steel Fdry. Co., E. Chicago, Ind.
Elmes Engineering Works, Chas. F., Chicago
* Farrel-Birmingham Co., Inc., Ansonia, Conn.
General Mfg. Co., Detroit
Hannifin Mfg. Co., Chicago
Hendley & Whittemore Co., Beloit, Wis.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Lake Erie Engrg. Corp., Kenmore, Buffalo, N. Y.
Logansport Machine, Inc., Logansport, Ind.
Long & Allstatter Div. of Columbia Machine Tool Co., Hamilton, O.
Medart Co., St. Louis
* Niagara Mach. & Tool Wks., Buffalo, N. Y.
Parker Appliance Co., Cleveland
Pels & Co., Inc., Henry, N. Y. C.
Ryerson & Son, Inc, Jos. T., Chicago
* Schatz Mfg. Co., Poughkeepsie, N. Y.
* Springfield Machine Tool Co., Springfield, O.
Thomas Machine Mfg. Co., Pittsburgh
United Engrg. & Foundry Co., Pittsburgh
U. S. Tool Co., Ampere, N. J.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.
* Watson-Stillman Co., Roselle, N. J.
Wickes Bros., Saginaw, Mich.
* Williams & Co. J. H., N. Y. C.
Williams, White & Co., Moline, Ill.
Wood Co., R. D., Philadelphia

BINS, Tool & Parts (See **LOCKERS & SHELVING**)

BITS, Tool
* Allegheny Ludlum Steel Corp., Pittsburgh
American Cutting Alloys, Inc., N. Y. C.
Anchor Drawn Steel Co., Pittsburgh
Apex Machine & Tool Co., Dayton, O.
* Armstrong Bros. Tool Co., Chicago
* Barber-Colman Co., Rockford, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Carboloy Co., Detroit
Carpenter Steel Co., Reading, Pa.
* Cleveland Twist Drill Co., Cleveland
Colonial Broach Co., Detroit
Colonial Steel Co., Pittsburgh
Columbia Tool Steel Co., Chicago
* Crafts Co., Inc., Arthur A., Boston
Crescent Tool Co., Jamestown, N. Y.
Crucible Steel Co. of America, N. Y. C.
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
Fansteel Metallurgical Corp., N. Chicago, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
* Gairing Tool Co., Detroit
* Gisholt Machine Co., Madison, Wis.
Gorham Tool Co., Detroit
* Haynes Stellite Co., N. Y. C.
Illinois Tool Works, Chicago
Ingersoll Milling Mach. Co., Rockford, Ill.
Jessop Steel Co., Washington, Pa.
Kelly Reamer Co., Cleveland
* Latrobe Electric Steel Co., Latrobe, Pa.
* McCrosky Tool Corp., Meadville, Pa.
* McKenna Metals Co., Latrobe, Pa.
Michigan Tool Co., Detroit
Morse Twist Drill & Mach. Co., New Bedford, Mass.
National Broach & Machine Co., Detroit
* National Tool Co., Cleveland
* Natl. Twist Drill & Tool Co., Detroit
O. K. Tool Co., Shelton, Conn.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Production Tool Co., Detroit
* Producto Machine Co., Bridgeport, Conn.
Prosser & Son, Thos., N. Y. C.
* Ready Tool Co., Bridgeport, Conn.
* Scully-Jones & Co., Chicago
Simonds Saw & Steel Co., Fitchburg, Mass.
Stoody Co., Whittier, Cal.
Super Tool Company, Detroit
* Union Twist Drill Co., Athol, Mass.
Universal Steel Co., Bridgeville, Pa.
* Vanadium Alloys Steel Co., Pittsburgh
* Vascoloy-Ramet Corp., N. Chicago, Ill.
Vincent Steel Process Co., Detroit
* Warner & Swasey Co., Cleveland
Wesson Co., Detroit
* Williams, J. H. & Co., N. Y. C.

BLADES, Circular-Saw (See **SAW BLADES, Circular**)

BLADES, Cutter, Milling, Boring & Reaming (see **BITS, Tool**)

BLADES, Hack- & Band-Saw
American Saw & Mfg. Co., Springfield, Mass.
* Armstrong-Blum Mfg. Co., Chicago
Atkins & Co., E. C., Indianapolis
Barnes Co., Inc., W. O., Detroit
* Capewell Mfg. Co., Hartford, Conn.
* Clemson Bros., Inc., Middletown, N. Y.
* Continental Machines, Inc., Minneapolis
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
* Grobet File Corp. of America, N. Y. C.
Laidlaw, Inc., Wm., Belmont, N. Y.
Millers Falls Co., Greenfield, Mass.
* Racine Tool & Mach. Co., Racine, Wis.
Simonds Saw & Steel Co., Fitchburg, Mass.
* Starrett Co., L. S., Athol, Mass.
Thompson & Sons Co., Henry G., New Haven, Conn.
* Victor Saw Works, Middletown, N. Y.

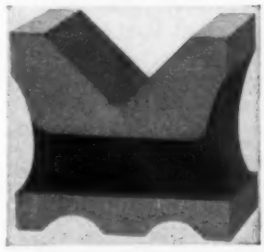
BLOCKS, Pillow
Ahlberg Bearing Co., Chicago
Allis-Chalmers Mfg. Co., Milwaukee
Bartlett & Snow Co., C. O., Cleveland
Boston Gear Works, Inc., N. Quincy, Mass.
Chain Belt Co., Milwaukee
Dodge Mfg. Corp., Mishawaka, Ind.
* Earle Gear & Machine Co., Philadelphia
Fafnir Bearing Co., New Britain, Conn.
* Farrel-Birmingham Co., Ansonia, Conn.
Hanson Clutch & Machy. Co., Tiffin, O.
* Hill Acme Co., Cleveland
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago
* Marlin Rockwell Corp., Jamestown, N. Y.
Medart Co., St. Louis
* Norma-Hoffmann Bearings Corp., Stamford, Conn.
Palmer-Bee Co., Detroit
Randall Graphite Prod. Corp., Chicago
Royersford Fdry. & Machry. Co., Royersford, Pa.
* S. K. F. Industries, Inc., Philadelphia
Shafer Bearing Corp., Chicago
* Standard Pressed Steel Co., Jenkintown, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.

BLOCKS, Precision Gage
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Dearborn Gage Co., Dearborn, Mich.
Ford Motor Co., Johansson Div., Dearborn, Mich.
* Lufkin Rule Co., Saginaw, Mich.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Scherr Co., Inc., Geo., N. Y. C.
* Standard Gage Co., Poughkeepsie, N. Y.
* Starrett Co., L. S., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.
* Webber Gage Co., Cleveland

BLOCKS, "V"
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Graham Mfg. Co., Providence, R. I.
Greenfield Tap & Die Corp., Greenfield, Mass.
* Lufkin Rule Co., Saginaw, Mich.
* Oliver Motor Craft Corp., Chicago
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Sheffield Gage Corp., Dayton, O.
* Starrett Co., L. S., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.

BLOWERS, Electric Hand
* Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.

"TRU-V" BLOCKS



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2532 S. Wabash Ave. Chicago, Ill.

WHERE-TO-BUY DIRECTORY

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Clements Mfg. Co., Chicago
Electric Blower Co., Boston
Ideal Commutator Dresser Co., Sycamore, Ill.
Independent Pneumatic Tool Co., Chicago
* Skilsaw, Inc., Chicago
Speedway Mfg. Co., Cicero, Ill.
Standard Electrical Tool Co., Cincinnati
Sturtevant, B. F., Hyde Park, Boston
U. S. Electrical Tool Co., Cincinnati

BLOWERS
Allis-Chalmers Mfg. Co., Milwaukee
* American Gas Furnace Co., Elizabeth, N. J.
Bendix Products Corp., So. Bend, Ind.
Binks Mfg. Co., Chicago
* Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., N. Y. C.
Clements Mfg. Co., Chicago
DeLaval Steam Turbine Co., Trenton, N. J.
DeVilbiss Company, Toledo, O.
Diehl Mfg. Co., Elizabethport, N. J.
Eclipse Fuel Engrg. Co., Rockford, Ill.
Emerson Electric Mfg. Co., St. Louis
* General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., N. Y. C.
Janette Mfg. Co., Chicago
Niagara Blower Co., Buffalo, N. Y.
North American Mfg. Co., Cleveland
Panghorn Corp., Hagerstown, Md.
Peerless Electric Co., Racine, Wis.
Signal Elec. Mfg. Co., Menominee, Mich.
South Bend Air Prods., Inc., So. Bend, Ind.
Spencer Turbine Co., Hartford, Conn.
Standard Electrical Tool Co., Cincinnati
* Strong, Carlisle & Hammond Co., Cleveland
Sturtevant Co., B. F., Hyde Park, Boston
Wagner Electric Corp., St. Louis
Wing Mfg. Co., L. J., N. Y. C.

BLUING, Layout
* Dayton Rogers Mfg Co., Minneapolis
* Dykem Co., St. Louis

BOARDS, Drawing (See **DRAFTING-ROOM SUPPLIES**)

BOLT & NUT MACHINES
* Ajax Mfg. Co., Euclid, Cleveland
Beaver Pipe Tools, Inc., Warren, O.
Bliss Co., E. W., Brooklyn, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
* Cleveland Automatic Machine Co., Cleveland
* Cone Automatic Mach. Co., Windsor, Vt.
* Consolidated Machine Tool Corp., Rochester, N. Y.
Davenport Machine Tool Co., Rochester, N. Y.
* Eastern Machine Screw Corp., New Haven, Conn.
* Federal Press Co., Elkhart, Ind.
* Foote-Burt Co., Cleveland
* Geometric Tool Co., New Haven, Conn.
* Goss & deLeeuw Machine Co., New Britain, Conn.
* Grant Mfg. & Machine Co., Bridgeport, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
* Hendey Machine Co., Torrington, Conn.
* Hill Acme Co., Cleveland
* Landis Machine Co., Waynesboro, Pa.
Merrell Mfg. Co., Toledo, O.
* Murchey Machine & Tool Co., Detroit
* National Acme Co., Cleveland
* National Machinery Co., Tiffin, O.
* New Britain-Gridley Machine Div., New Britain, Conn.
Oster Mfg. Co., Cleveland
Pipe Machinery Co., Cleveland
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Rickert-Shafer Co., Erie, Pa.
* Scherr Co., Geo., N. Y. C.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Toledo Pipe Threading Machine Co., Toledo, O.
* V. & O. Press Co., Hudson, N. Y.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

BOLTS, Eye
* American Chain & Cable Co., Bridgeport, Conn.
* Armstrong Bros. Tool Co., Chicago
Bethlehem Steel Co., Bethlehem, Pa.
Billings & Spencer Co., Hartford, Conn.
Lamson & Sessions Co., Cleveland
National Screw & Mfg. Co., Cleveland
Oliver Iron & Steel Corp., Pittsburgh
* Republic Steel Corp., Cleveland
* Williams & Co., J. H., N. Y. C.

BOLTS & NUTS
Acme Machine Products Co., Muncie, Ind.
Atlas Bolt & Screw Co., Cleveland
Bayonne Bolt Corp., Bayonne, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Boots Aircraft Nut Corp., Waterbury, Conn.
Cap Screw & Nut Co., N. Y. C.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Cap Screw Co., Cleveland
Dardelet Threadlock Corp., N. Y. C.
Elastic Stop Nut Corp., Union, N. J.
Lamson & Sessions Co., Cleveland
Ohio Nut & Bolt Co., Berea, O.
* Parker-Kalon Corp., N. Y. C.
Pawtucket Mfg. Co., Pawtucket, R. I.
Pittsburgh Screw & Bolt Corp., Pittsburgh
Rawlplug Co., N. Y. C.
* Republic Steel Corp., Cleveland
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
* Standard Pressed Steel Co., Jenkintown, Pa.
Tinnerman Products Co., Cleveland
* Williams & Co., J. H., N. Y. C.

BORING, DRILLING & MILLING MACHINES, Horizontal
* Barnes Co., W. F. & John, Rockford, Ill.
* Baush Machine Tool Co., Springfield, Mass.
* Bryant Machinery & Engrg. Co., Chicago
Buhr Machine Tool Co., Ann Arbor, Mich.
* Cincinnati-Gilbert Machine Tool Co., Cincinnati
* Consolidated Machine Tool Corp., Rochester, N. Y.
Defiance Machine Works, Defiance, O.
* Foote-Burt Co., Cleveland
* Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
Greenlee Bros. & Co., Rockford, Ill.
Ingersoll Milling Mach. Co., Rockford, Ill.
* Lucas Machine Tool Co., Cleveland
Mesta Machine Co., Pittsburgh
* Moline Tool Co., Moline, Ill.
Morton Mfg. Co., Muskegon Hgts., Mich.
* National Acme Co., Cleveland
National Automatic Tool Co., Richmond, Ind.
Niles Tool Works Co., Hamilton, O.
Ohio Machine Tool Co., Kenton, O.
Portage Machine Co., Akron, O.
Rockford Drilling Machine Div., Borg-Warner Corp., Rockford, Ill.
* Sellers & Co., Inc., Wm., Philadelphia
* Snyder Tool & Engrg. Co., Detroit
* Springfield Machine Tool Co., Springfield, O.
Universal Boring Machine Co., Hudson, Mass.
Yoder Co., Cleveland

BORING MACHINES, Jig (See **JIG-BORING MACHINES**)

BORING MACHINES, Precision
Atlas Press Co., Kalamazoo, Mich.
* Barnes Co., W. F. & John, Rockford, Ill.
* Bryant Machinery & Engrg. Co., Chicago
Cochrane-Bly Co., Rochester, N. Y.
Defiance Machine Works, Defiance O.
* Ex-Cell-O Corp., Detroit
* Giddings & Lewis Mach. Tool Co., Fond du Lac, Wis.
* Heald Machine Co., Worcester, Mass.
* Leland-Gifford Co., Worcester, Mass.
* Lucas Machine Tool Co., Cleveland
* Moline Tool Co., Moline, Ill.
* Moore Machinery Co., San Francisco
National Automatic Tool Co., Richmond, Ind.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Rivett Lathe & Grinders, Inc., Brighton, Boston
Rockford Drilling Machine Co., Rockford, Ill.
* Sheffield Corp., Gage Div., Dayton, O.
Stamets, Wm. K., Pittsburgh
Stokerunit Corp., Milwaukee
Universal Boring Machine Co., Hudson, Mass.

BORING MILLS, Vertical
* Baush Machine Tool Co., Springfield, Mass.
* Bullard Co., Bridgeport, Conn.
* Cincinnati Planer Co., Oakley, Cincinnati
* Consolidated Machine Tool Corp., Rochester, N. Y.
Jones Machine Tool Works, Inc., Philadelphia, Pa.
* King Machine Tool Co., Cincinnati
Portage Machine Co., Akron, O.
Niles Tool Works Co., Hamilton, O.
* Sellers & Co., Inc., Wm., Philadelphia
* Springfield Machine Tool Co., Springfield, Ohio

BOXES, Heat-Treating & Annealing
American Manganese Steel Div., Chicago Hgts., Ill.
Driver-Harris Co., Harrison, N. J.
Electro-Alloys Co., Elyria, O.
National-Erie Corp., Erie, Pa.
General Alloys Co., Boston
Seamless Products Co., N. Y. C.
* Strong, Carlisle & Hammond Co., Cleveland

BOXES, Tool (See **CHESTS, Tool**)

BOXES, Tote
All-Steel Equip., Aurora, Ill.
American Metal Works, Inc., Philadelphia
Barrett-Cravens Co., Chicago
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Continental-Diamond Fibre Co., Bridgeport, Pa.
* Lucas & Son, Inc., J. L., Bridgeport, Conn.
Lyon Metal Products Co., Aurora, Ill.
Pollard Bros. Mfg. Co., Chicago
Powell Pressed Steel Co., Hubbard, O.
Seamless Prod. Co., Inc., N. Y. C.
Service Caster & Truck Co., Albion, Mich.
Stackbin Corp., Providence, R. I.
* Standard Pressed Steel Co., Jenkintown, Pa.
Truscon Steel Corp., Youngstown, O.

BRAKE, Linings
Johns-Manville Sales Corp., N. Y. C.
Raybestos Div., Raybestos-Manhattan, Inc., Stratford, Conn.
Wellman Co., S. K., Cleveland

BRAKES, Bending, Power
Bliss Co., E. W., Brooklyn, N. Y.
* Bryant Machinery & Engrg. Co., Chicago
* Cincinnati Shaper Co., Cincinnati
Cleveland Crane & Engrg. Co., Wickliffe, O.
* Cleveland Punch & Shear Works Co., Cleveland
Columbia Machine Tool Co., Hamilton, O.
Dries & Krump Mfg. Co., Chicago
Henderson Machine Co., Philadelphia
Quickwork-Whiting Corp., Harvey, Ill.
United Engineering & Foundry Co., Pittsburgh
Verson Allsteel Press Co., Chicago
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, Electric
Cutler-Hammer, Inc., Milwaukee
Dings Magnetic Separator Co., Milwaukee
Electric Controller & Mfg. Co., Cleveland
* General Electric Co., Schenectady, N. Y.

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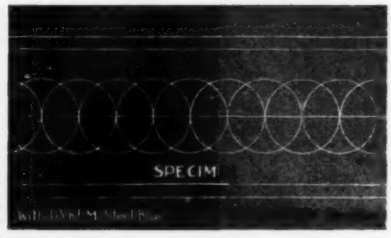

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WHERE-TO-BUY DIRECTORY

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Stearns Magnetic Mfg. Co., Milwaukee
* Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

BRAKES, Hydraulic
Bendix Prods. Div., Bendix Aviation Corp., South Bend, Ind.
* Taylor Mfg. Co., Milwaukee
Wagner Electric Corp., St. Louis

BRICK, Furnace (See **REFRACTORIES**)

BROACHES
American Broach & Machine Co., Ann Arbor, Mich.
Apex Broach Co., Detroit
* Butterfield & Co., Div., Union Twist Drill Co., Derby Line, Vt.
Colonial Broach & Mach. Co., Detroit
Connecticut Broach & Machine Co., New London, Conn.
Detroit Broach Co., Detroit
Detroit Tap & Tool Co., Detroit
* Ex-Cell-O Corp., Detroit
Gammons, Holman Co., Manchester, Conn.
* Haynes Stellite Co., N. Y. C.
Illinois Tool Works, Chicago
* Lapointe Machine Tool Co., Hudson, Mass.
Michigan Tool Co., Detroit
National Broach & Mach. Co., Detroit
* National Tool Co., Cleveland
* Oilgear Co., Milwaukee
* Union Twist Drill Co., Athol, Mass.

BROACHING MACHINES
American Broach & Machine Co., Ann Arbor, Mich.
* Cincinnati Milling Machine Co., Cincinnati
Colonial Broach & Machine Co., Detroit
* Consolidated Machine Tool Corp., Rochester, N. Y.
Elmes Engrg. Works, Chas. F., Chicago
* Foote-Burt Co., Cleveland
Greenerd Arbor Press, Nashua, N. H.
Hanchett Mfg. Co., Big Rapids, Mich.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
* Lapointe Machine Tool Co., Hudson, Mass.
Michigan Tool Co., Detroit
Niles Tool Works Co., Hamilton, O.
Nixon Gear & Machine Co., Syracuse
* Oilgear Co., Milwaukee
* Thompson Grinder Co., Springfield, O.

BUFFERS & POLISHERS
Acme Mfg. Co., Detroit
Baldor Electric Co., St. Louis
* Black & Decker Mfg. Co., Towson, Md.
Blount, J. G., Everett, Mass.
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.
Buckeye Portable Tool Co., Dayton, O.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Pneumatic Tool Co., N. Y. C.
Cincinnati Elec. Tool Co., Cincinnati
Clark, Jas. Jr., Electric Co., Louisville, Ky.
Cleveland Elec. Motor Co., Cleveland
* Continental Machines, Inc., Minneapolis
Continental Roll & Steel Fdry., E. Chicago, Ind.
Crown Rheostat & Supply Co., Chicago
Delta Mfg. Co., Milwaukee
Diehl Mfg. Co., Elizabethport, N. J.
Divine Bros. Co., Utica, N. Y.
Dumore Co., Racine, Wis.
Excelsior Tool & Machine Co., E. St. Louis, Ill.
Forbes & Myers, Worcester, Mass.
Gardner Machine Co., Beloit, Wis.
* Hammond Machinery Builders, Inc., Kalamazoo, Mich.
Hanchett Mfg. Co., Big Rapids, Mich.
Hanson-Van Winkle-Munning Co., Mattawan, N. J.
* Haskins Co., R. G., Chicago
* Hill-Acme Co. Cleveland
* Hisey-Wolf Machine Co., Cincinnati
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
* Landis Tool Co., Waynesboro, Pa.
L'Hommedieu & Sons Co., Chas. F., Chicago
Mall Tool Co., Chicago
* Mattison Machine Works, Rockford, Ill.
Oliver Machinery Co., Grand Rapids, Mich.
* New Britain-Gridley Mach. Co., New Britain, Conn.
Packer Machine Co., Meriden, Conn.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Production Machine Co., Greenfield, Mass.
Prosser & Son, Thomas, N. Y. C.
Rome Machry. Sales & Engrg. Co., Rome, N. Y.
Rotor Air Tool Co., Cleveland
Royersford Fdry. & Mach. Co., Royersford, Pa.
* Schauer Machine Tool Co., Cincinnati
Shakespeare Products Co., Kalamazoo, Mich.
Standard Electrical Tool Co., Cincinnati
Stanley Electrical Tool Div. of Stanley Works, New Britain, Conn.
Stow Mfg. Co., Binghamton, N. Y.
* Strand & Co., N. A., Chicago
Swartz & White Mfg. Co., Binghamton, N. Y.
Udylite Co., Detroit
U. S. Electrical Tool Co., Cincinnati
* Van Dorn Elec. Tool Co., Towson, Md.
Vonnegut Moulder Corp., Indianapolis
* Walker-Turner Co., Plainfield, N. J.

BUFFERS & POLISHERS, Hand
Behr-Manning, Troy, N. Y.
Weldon Roberts Rubber Co., Newark, N. J.

BULLDOZERS
* Ajax Mfg. Co., Euclid, Cleveland
Baldwin-Southwark Corp., Paschall, Philadelphia
Beatty Mach. & Mfg. Co., Hammond, Ind.
Chambersburg Engineering Co., Chambersburg, Pa.
Columbia Machine Tool Co., Hamilton, O.
Elmes Eng. Works, Chas. F., Chicago
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Keckley, O. C., Chicago
Rock River Machine Co., Janesville, Wis.
* Watson-Stillman Co., Roselle, N. J.
Williams, White & Co., Moline, Ill.
Wood Company, R. D., Philadelphia

BURNERS, Gas & Oil Furnace
* American Gas Furnace Co., Elizabeth, N. J.
Hauck Mfg. Co., Brooklyn, N. Y.
* Hones, Inc., Charles A., Baldwin, N. Y.
North American Mfg. Co., Cleveland
* Rockwell Co., W. S., N. Y. C.
Scovill Mfg. Co., Waterbury, Conn.
* Strong, Carlisle & Hammond Co., Cleveland
Surface Combustion Corp., Toledo, O.

BURNISHERS, Gear
Colonial Broach Co., Detroit
Detroit Tap and Tool Co., Detroit
* Fellows Gear Shaper Co., Springfield, Vt.
* Gleason Works, Rochester, N. Y.
Michigan Tool Co., Detroit
National Broach & Machine Co., Detroit
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

BURNISHING MACHINES
Baird Machine Co., Bridgeport, Conn.
* Consolidated Machine Tool Corp., Rochester, N. Y.
* Fellows Gear Shaper Co., Springfield, Vt.
Michigan Tool Co., Detroit
Niles Tool Works Co., Hamilton, O.
Taylor Wilson Mfg. Co., McKees Rocks, Pa. (Tube & Bar)

BURRING MACHINES
* Ajax Mfg. Co., Euclid, Cleveland
Bliss Co., E. W., Brooklyn, N. Y.
Cincinnati Electrical Tool Co., Cincinnati
* Consolidated Mach. Tool Corp., Rochester, N. Y.
Cross Gear & Machine Co., Detroit
* Hill Acme Co., Cleveland
National Broach & Machine Co., Detroit
* National Machinery Co., Tiffin
* Niagara Mach. & Tool Co., Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.

BUSHINGS, Drill
Carboloy Co., Detroit
Colonial Broach Co., Detroit
Detroit Tap & Tool Co., Detroit
* Ex-Cell-O Corp., Detroit
* Giern & Anholtt Tool Co., Detroit
Jig Bushing Co., Pontiac, Mich.
Metal Carbides Corp., Youngstown, O.
* Universal Engrg. Co., Frankenmuth, Mich.

CABINETS, Steel (See **LOCKERS & SHELVING**)

CALCULATORS, Electric
International Business Machines, Endicott, N. Y.
Marchant Calculating Machine Co., Oakland, Calif.
Monroe Calculating Machine Co., Orange, N. J.
Remington Rand, Inc., Buffalo, N. Y.

CALIPERS & COMPASSES
* Armstrong Bros. Tool Co., Chicago
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Farrel-Birmingham Co., Inc., Ansonia, Conn.
* Lufkin Rule Co., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
* Randall & Stickney, Waltham, Mass.
* Scherr Co., Geo., N. Y. C.
* Slocomb Co., J. T., Providence, R. I.
* Starrett Co., L. S., Athol, Mass.

CAMS, Machine
* Brown & Sharpe Mfg. Co., Providence, R. I.
Cross Gear & Machine Co., Detroit
* Hartford Special Machinery Co., Hartford, Conn.
Heppenstall Co., Pittsburgh
Kux-Lohner Machine Co., Chicago
Massachusetts Gear & Tool Co., Woburn, Mass.
Modern Collet & Mach. Co., Ecorse, Mich.
Rowbottom Machine Co., Waterbury, Conn.

CARBURIZERS (See also **BOXES, Heat-Treating & Annealing**)
* American Gas Furnace Co., Elizabeth, N. J.
Holden Co., A. F., New Haven, Conn.
Houghton & Co., E. F., Philadelphia
Leeds & Northrup Co., Philadelphia
* Rockwell Co., W. S., N. Y. C.
Surface Combustion Corp., Toledo, O.

CARDS & BRUSHES, File
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
Manufacturers Brush Co., Cleveland
* Nicholson File Co., Providence, R. I.
Watson-Williams Mfg. Co., Leicester, Mass.

CARTRIDGE-CASE FINISHING MACHINES
* Coulter Machine Co., James, Bridgeport, Conn.
Frew Machine Co., Philadelphia
* Sundstrand Machine Tool Co., Rockford, Ill.

CELLS, Photo-Electric
Continental Electric Co., Geneva, Ill.
* General Electric Co., Schenectady, N. Y.
General Scientific Corp., Chicago
Loewenberg, Dr. F., N. Y. C.
National Carbon Co., N. Y. C.
Westinghouse Lamp Div., Bloomfield, N. J.
Weston Elec. Inst. Corp., Newark, N. J.

CEMENT, Belt
Chicago Rawhide Mfg. Co., Chicago
* Desmond-Stephan Mfg. Co., Urbana, O.
Dixon Crucible Co., Jos., Jersey City, N. J.

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Frictionless—Rotary
For core drilling, T. C. and high speed boring, turret tool piloting, etc. Won't stick or clog. Dust proof as a watch.
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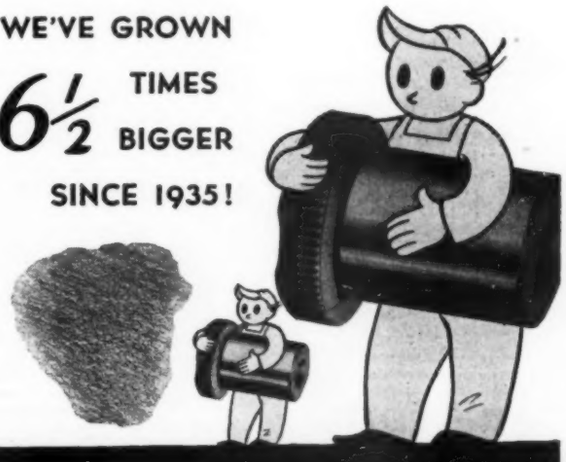

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Graton & Knight Co., Worcester, Mass.
Houghton & Co., E. F., Philadelphia
Rhoads & Sons, J. E., Philadelphia

CEMENT, Disk-Wheel
Bakelite Corp., N. Y. C.
Gardner Machine Co., Beloit, Wis.
Hanchett Mfg. Co., Big Rapids, Mich.
Maas & Waldstein, Newark, N. J.
* Walls Sales Corp., N. Y. C.

CEMENT, Refractory
Atlas Lumnite Cement Co., Chicago
Babcock & Wilcox Co., N. Y. C.
Betson Plastic Fire Brick Co., Buffalo, N. Y.
Botfield Refractories Co., Philadelphia
* Carborundum Co., Niagara Falls, N. Y.
Denver Fire Clay Co., Denver, Col.
General Refractories Co., Philadelphia
Green Fire Brick Co., Mexico, Mo.
Harbison-Walker Refractories Co., Pittsburgh
Johns-Manville, N. Y. C.
North American Refractories Co., Cleveland
Norton Company, Worcester, Mass.
Plibrico Jointless Firebrick Co., Chicago
Quigley Co., Inc., N. Y. C.

CENTERING MACHINES
* Consolidated Mach. Tool Corp., Rochester, N. Y.
Garrison Machine Works, Inc., Dayton
* Hanson-Whitney Machine Co., Hartford, Conn.
Heller Machine Co., N. Y. C.
* Hendey Machine Co., Torrington, Conn.
* Jones & Lamson Machine Co., Springfield, Vt.
Logansport Machine, Inc., Logansport, Ind.
Niles Tool Works Co., Hamilton, O.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Seneca Falls Mach. Co., Seneca Falls, N. Y.
* Sundstrand Mach. Tool Co., Rockford, Ill.
Whiton Machine Co., D. E., New London, Conn.

CENTERS, Bench
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Dearborn Gage Co., Dearborn, Mich.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Starrett Co., L. S., Providence, R. I.

CENTERS, Machine
* Abrasive Machine Tool Co., East Providence, R. I.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Bullard Company, Bridgeport, Conn.
Carboloy Co., Detroit
* Cincinnati Lathe & Tool Co., Oakley, Cincinnati
* Cleveland Twist Drill Co., Cleveland
Eclipse Counterbore Co., Detroit
Fansteel Metallurgical Corp., N. Chicago, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
* Gisholt Machine Co., Madison, Wis.
Gorham Tool Co., Detroit
Gould & Eberhardt, Irvington N. J.
* Haynes Stellite Co., N. Y. C.
* Hendey Machine Co., Torrington, Conn.
Ideal Commutator Dresser Co., Sycamore, Ill.
* Knight Machinery Co., W. B., St. Louis
* McKenna Metals Co., Inc., Latrobe, Pa.
Metal Carbides Corp., Youngstown, O
Michigan Tool Co., Detroit
* Morse Tool Co., Detroit
Morse Twist Drill & Mach. Co., New Bedford, Mass.
* Motor Tool Mfg. Co., Detroit
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Ready Tool Co., Bridgeport, Conn.
Rigid Tool Co., Detroit
* Scully-Jones & Co., Chicago
Standard Tool Co., Cleveland
Super Tool Co., Detroit
Taft-Peirce Mfg. Co., Woonsocket, R. I.
* Tungsten Carbide Tool Co., Detroit
* Vascoloy-Ramet Corp., N. Chicago, Ill.
* Warner & Swasey Co., Cleveland
Wesson Co., Detroit
Whitman & Barnes, Detroit

CENTRIFUGALS (See **PURIFIERS, Oil & Coolant**)

CENTRIFUGAL MACHINERY
Barrett Co., Leon J., Worcester, Mass.
* DeLaval Separator Co., N. Y. C.
* Tolhurst Div., American Machine & Metals Co., E. Moline, Ill.

CHAIN, Forged-Steel Link
* American Chain & Cable Co., Bridgeport, Conn.
Bartlett & Snow, C. O., Cleveland
Brewer-Titchener Corp., Cortland, N. Y.
Clapp Mfg. Co., E. D., Auburn, Ill.
Chain Belt Co., Milwaukee
Columbus-McKinnon Chain Corp., Tonawanda, N. Y.
Endicott Forging & Mfg. Co., Inc., Endicott, N. Y.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Chicago
McKay Co., Pittsburgh
Palmer-Bee Co., Detroit
* Scully Steel Products Co., Chicago
Transue & Williams Steel Forging Corp., Alliance, O.

CHAINS, Conveyor
Allis-Chalmers Mfg. Co., Milwaukee
* American Chain & Cable Co., Bridgeport, Conn.
American Manganese Steel Div. of American Brake Shoe & Fdry. Co., Chicago Hgts., Ill.
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett & Snow, C. O., Cleveland
Boston Gear Works Inc., N. Quincy, Mass.
Chain-Belt Co., Milwaukee
Diamond Chain & Mfg. Co., Indianapolis
Dodge Mfg. Co., Mishawaka, Ind.
Foote Gear Works, Inc., Chicago
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Indianapolis
Palmer-Bee Co., Detroit
Stephens-Adamson Mfg. Co., Aurora, Ill.
Whitney Chain & Mfg. Co., Hartford, Conn.

CHAINS, Transmission
Bilgram Gear & Machine Works, Philadelphia
Boston Gear Works Inc., N. Quincy, Mass.
Cincinnati Gear Co., Cincinnati
Diamond Chain & Mfg. Co., Indianapolis
Link-Belt Co., Indianapolis
Morse Chain Co., Ithaca, N. Y.
Ohio Gear Co., Cleveland
Palmer-Bee Co., Detroit
Ramsey Chain Co., Albany, N. Y.
Whitney Chain & Mfg. Co., Hartford, Conn.

CHAMFERING MACHINES
Bilgram Gear & Machine Works, Philadelphia
* Consolidated Machine Tool Corp., Rochester, N. Y.
Cross Gear & Machine Co., Detroit
* Grant Mfg. & Machine Co., Bridgeport, Conn.
Lipe, Inc., W. C., Syracuse, N. Y.
* Murchey Machine & Tool Co., Detroit
National Broach & Machine Co., Detroit
Thomas Machine Mfg. Co., Pittsburgh

CHARGERS, Battery
Baker-Raulang Co., Cleveland
Cutler-Hammer, Inc., Milwaukee
Fansteel Metallurgical Corp., N. Chicago, Ill.
* General Electric Co., Schenectady, N. Y.
Raytheon Mfg. Co., Waltham, Mass.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
* Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

CHASERS (See **DIE-HEADS, Solid Adjustable**)

CHECKS, Metal, Time and Tool
Acromark Co., Elizabeth, N. J.
H. K. Metal Craft Mfg. Corp., N. Y. C.
* Noble & Westbrook Mfg. Co., East Hartford, Conn.
Revere Copper & Brass Inc., N. Y. C.
Scoville Mfg. Co., Waterbury, Conn.
Wrought Washer Mfg. Co., Milwaukee

CHESTS, Tool
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Blackhawk Mfg. Co., Milwaukee
Frick-Gallagher Mfg. Co., Wellston, O.
* Geometric Tool Co., New Haven, Conn.
Gerstner & Sons, H., Dayton, O.
* Lufkin Rule Co., Saginaw, Mich.
Seamless Prod. Co., N. Y. C.
Stanley Tools, New Britain, Conn.
Union Steel Chest Corp., LeRoy, N. Y.
Western Tool & Mfg. Co., Springfield, O.

CHISELS, Hand (See **TOOLS, Hand**)

CHISELS, Chipping, Pneumatic & Electric Hammer
Bethlehem Steel Co., Bethlehem, Pa.
* Black & Decker Mfg. Co., Towson, Md.
Chicago Pneumatic Tool Co., N. Y. C.
Cincinnati Tool Co., Cincinnati
* Cleveland Pneumatic Tool Co., Cleveland
Drew & Co., C., Kingston, Mass.
Hubbard & Co., Pittsburgh
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
Lippert Saw Co., E. T., Pittsburgh
Oxford Tool Co., Philadelphia
Plomb Tool Co., Los Angeles, Calif.
Salem Tool Co., The, Salem, Ohio
* Scully-Jones & Co., Chicago
Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
Star Bit & Tool Co., Rockford, Ill.
Van Dorn Elec. Tool Co., Towson, Md

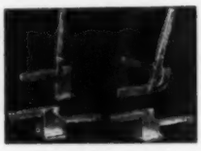
CHUCKING MACHINES (See also **LATHES, Automatic & Semi-Automatic**)
Baird Machine Co., Bridgeport, Conn.
* Bullard Co., Bridgeport, Conn.
* Cincinnati Lathe & Tool Co., Oakley, Cincinnati
* Cleveland Automatic Machine Co., Cleveland
* Cone Automatic Machine Co., Windsor, Vt.
* Foote-Burt Co., Cleveland
Foster Machine Co., Elkhart, Ind.
* Gisholt Machine Co., Madison, Wis.
* Gorton Machine Co., George, Racine, Wis.
* Goss & deLeeuw Mach. Co., New Britain, Conn.
* Jones & Lamson Machine Co., Springfield, Vt.
* Lees-Bradner Co., Cleveland
* National Acme Co., Cleveland
* New Britain-Gridley Mach. Div., New Britain, Conn.
* Potter & Johnston Machine Co., Pawtucket, R. I.
* Production Machinery Development Co., Detroit
* Warner & Swasey Co., Cleveland

CHUCKS, Air (See **CHUCKS, Pneumatic**)

CHUCKS, Collet (See **Collets**)

CHUCKS, Drill & Tap
* Acme Tool Co., N. Y. C.
Alco Tool Co., Bridgeport, Conn.
Apex Mach. & Tool Co., Dayton, O.
Buhr Machine Tool Co., Ann Arbor, Mich.
Chicago Pneumatic Tool Co., N. Y. C.
Chicago Tool & Engrg. Co., Chicago
* Errington Mech. Lab., Stapleton, N. Y.
* Etteo Tool Co., Brooklyn, N. Y.
* Gisholt Machine Co., Madison, Wis.
Independent Pneumatic Tool Co., Chicago
* Jacobs Mfg. Co., Hartford, Conn.
Jarvis Co., Chas. L., Middletown, Conn.
Lee & Sons, K. O., Aberdeen, S. D.
* McCrosky Tool Corp., Meadville, Pa.
* Morse Tool Co., Detroit
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Nielsen Tool & Die Co., Berkley, Mich.
North Bros. Mfg. Co., Philadelphia
Procunier Safety Chuck Co., Chicago

PECO TIME SAVING CLAMPS



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* Scully-Jones & Co., Chicago
Skinner Chuck Co., New Britain, Conn.
Standard Tool Co., Cleveland
Thomas Hoist Co., Chicago
Westcott Chuck Co., Oneida, N. Y.

CHUCKS, Drill, Quick-Change, Collet
Chicago Tool & Eng. Co., Chicago
Collis Co., Clinton, Iowa
* Errington Mech. Lab., Stapleton, N. Y.
* Gairing Tool Co., Detroit
Glenzer, J. C., Co., Detroit
Jarvis, Chas. L. Co., Middletown, Conn.
* Modern Tool Works, Div. Consol. Mach. Tool Corp., Rochester, N. Y.
Procunier Safety Chuck Co., Chicago
* Scully-Jones & Co., Chicago

CHUCKS, Gear
Anker, Holth Mfg. Co., Port Huron, Mich.
Cotta Gear Co., Rockford, Ill.
* Cushman Chuck Co., Hartford, Conn.
Garrison Machine Works, Inc., Dayton, O.
* Gleason Works, Rochester, N. Y.
Lemaire Tool & Mfg. Co., Dearborn, Mich.
Logansport Machine Inc., Logansport, Ind.
* Sheffield Corp., Gage Div., Dayton, O.
Skinner Chuck Co., New Britain, Conn.
Whiton, D. E., Machine Co., New London, Conn.

CHUCKS, Hydraulic
Anker, Holth Mfg. Co., Port Huron, Mich.
Cross Gear & Machine Co., Detroit
* Cushman Chuck Co., Hartford, Conn.
* Gisholt Machine Co., Madison, Wis.
Hannifin Mfg. Co., Chicago
Logansport Machine, Inc., Logansport, Ind.
* New Britain-Gridley Machine Div., New Britain, Conn.
* Potter & Johnston Machine Co., Pawtucket, R. I.
Skinner Chuck Co., New Britain, Conn.
* Tomkins-Johnson Co., Jackson, Mich.
* Warner & Swasey Co., Cleveland

CHUCKS, Lathe
Anker, Holth Mfg. Co., Port Huron, Mich.
Atlas Press Co., Kalamazoo, Mich.
Boice Crane Co., Toledo
* Cincinnati Lathe & Tool Co., Oakley, Cincinnati
* Cushman Chuck Co., Hartford, Conn.
Delta Mfg. Co., Milwaukee
Foster Machine Co., Elkhart, Ind.
* Gisholt Machine Co., Madison, Wis.
Hardinge Brothers, Inc., Elmira, N. Y.
Harnischfeger Corp., Milwaukee
* Hendey Machine Co., Torrington, Conn.
Logansport Machine, Inc., Logansport, Ind.
* L-W Chuck Co., Toledo, O.
* McCrosky Tool Corp., Meadville, Pa.
* Potter & Johnston Machine Co., Pawtucket, R. I.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Rivett Lathe & Grinders, Inc., Brighton, Boston
* Scherr Co., Geo., N. Y. C.
Sjogren Mfg. Co., Los Angeles
Skinner Chuck Co., New Britain, Conn.
Stark Tool Co., Waltham, Mass.
Steege Machinery Co., Chicago
Thomas Hoist Co., Chicago
* Tomkins-Johnson Co., Jackson, Mich.
Union Mfg. Co., New Britain, Conn.
Westcott Chuck Co., Oneida, N. Y.
Whiton, D. E., Mfg. Co., New London, Conn.

CHUCKS, Magnetic
* Abrasive Machine Tool Co., E. Providence, R. I.
Arter Grinding Machine Co., Worcester, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Heald Machine Co., Worcester, Mass.
* L-W Chuck Co., Toledo, O.
Robbins Engrg. Co., Detroit
Steege Machine Co., Chicago

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Taft-Peirce Mfg. Co., Woonsocket, R. I.
* Walker Co., O. S., Worcester, Mass.

CHUCKS, Motorized Electric
* Cushman Chuck Co., Hartford, Conn.
* Goss & deLeeuw Machine Co., New Britain, Conn.
* Potter & Johnston Machine Co., Pawtucket, R. I.
* Warner & Swasey Co., Cleveland

CHUCKS, Pneumatic
Anker, Holth Mfg. Co., Port Huron, Mich.
* Cushman Chuck Co., Hartford, Conn.
Hanna Engineering Works, Chicago
Hannifin Mfg. Co., Chicago
Logansport Machine Inc., Logansport, Ind.
* Potter & Johnston Machine Co., Pawtucket, R. I.
Skinner Chuck Co., New Britain, Conn.
* Tomkins-Johnson Co., Jackson, Mich.
* Warner & Swasey Co., Cleveland

CHUCKS, Ring-Wheel
* Abrasive Machine Tool Co., E. Providence, R. I.
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Conn.
Gardner Machine Co., Beloit, Wis.
Hanchett Mfg. Co., Big Rapids, Mich.

CHUCKS, Spring
* Brown & Sharpe Mfg. Co., Providence, R. I.
Harnischfeger Corp., Milwaukee
Modern Collet & Machine Co., Ecorse, Mich.
Morrison Machine Products Div., Elmira, N. Y.
* Rivett Lathe & Grinders Inc., Brighton, Boston

CLAMPS, Machinist's
Advance Machine Works, Ft. Wayne, Ind.
* Armstrong Bros. Tool Co., Chicago
Automatic Vise Sales Co., Los Angeles
Billings & Spencer, Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee
Bonney Forge & Tool Works, Allentown, Pa.
* Brown & Sharpe Mfg. Co., Providence, R. I.
Cincinnati Clamp Co., Cincinnati
Cincinnati Tool Co., Cincinnati
K. O. Products, Benton Harbor, Mich.
Kmu-Vise Products Co., Inc., Detroit
* Lufkin Rule Co., Saginaw, Mich.
North Bros. Mfg. Co., Philadelphia
Peck, Stow & Wilcox, Southington, Conn.
* Products Engrg. Co., Los Angeles
Sargent & Co., New Haven, Conn.
Western Tool & Mfg. Co., Springfield, O.
* Williams & Co., J. H., N. Y. C.

CLEANERS, Metal (See **COMPOUNDS, Cleaning**)

CLEANING EQUIPMENT (See **METAL-CLEANING EQUIPMENT**)

CLOTH, Abrasive (See **PAPER & CLOTH, Abrasive**)

CLOTHING, Industrial
Reeves Brothers, Inc., N. Y. C.

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- Yale & Towne Mfg. Co., Philadelphia

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- * V. & O. Press Co., Hudson, N. Y.
- Verson All-Steel Press Co., Chicago

CUTTERS, Angle
- * Barber-Colman Co., Rockford, Ill.
- * Brown & Sharpe Mfg. Co., Providence, R. I.
- * Butterfield Div., Union Twist Drill Co., Derby Line, Vt.
- Carboloy Co., Detroit
- Eclipse Counterbore Co., Detroit
- * Ex-Cell-O Corp., Detroit
- Firth-Sterling Steel Co., McKeesport, Pa.
- * Gairing Tool Co., Detroit
- Goddard & Goddard Co., Detroit
- Illinois Tool Works, Chicago
- Michigan Tool Co., Detroit
- * McCrosky Tool Co., Meadville, Pa.
- * McKenna Metals Co., Inc., Latrobe, Pa.
- Morse Twist Drill & Mach. Co., New Bedford, Mass.
- * National Tool Co., Cleveland
- * National Twist Drill & Tool Co., Detroit
- * Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
- * Scully Jones & Co., Chicago

CUTTERS, Die-Sinking
- Detroit Tap & Tool Co., Detroit
- Eclipse Counterbore Co., Detroit
- * Gairing Tool Co., Detroit
- * Gorton Machine Co., Geo., Racine, Wis.
- Gorham Tool Co., Detroit
- Illinois Tool Works, Chicago
- Michigan Tool Co., Detroit
- Morse Twist Drill & Machine Co., New Bedford, Mass.
- * National Tool Co., Cleveland
- * National Twist Drill & Tool Co., Detroit
- * Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
- * Scully Jones & Co., Chicago
- * Tomkins-Johnson Co., Jackson, Mich.
- * Union Twist Drill Co., Athol, Mass.

CUTTERS, Formed
- Atkins & Co., E. C., Indianapolis
- * Barber-Colman Co., Rockford, Ill.
- * Brown & Sharpe Mfg. Co., Providence, R. I.
- Carboloy Co., Detroit
- * Cleveland Twist Drill Co., Cleveland
- * Consolidated Machine Tool Corp., Rochester, N. Y.
- Detroit Tap & Tool Co., Detroit
- * Disston & Sons, Inc., Henry, Tacony, Philadelphia
- Eclipse Counterbore Co., Detroit
- * Ex-Cell-O Corp., Detroit
- Firth-Sterling Steel Co., McKeesport, Pa.
- * Gairing Tool Co., Detroit
- Gammons Holman Co., Manchester, Conn.
- Goddard & Goddard Co., Detroit
- Gorham Tool Co., Detroit
- * Haynes Stellite Co., N.Y.C.
- Illinois Tool Works, Chicago
- Ingersoll Milling Mach. Co., Rockford, Ill.
- Kelly Reamer Co., Cleveland
- Michigan Tool Co., Detroit
- Morrison Machine Products Div., Elmira, N. Y.
- Morse Twist Drill & Machine Co., New Bedford, Mass.
- * National Tool Co., Cleveland
- * National Twist Drill & Tool Co., Detroit
- O. K. Tool Co., Shelton, Conn.
- * Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
- Production Tool Co., Detroit

WHERE-TO-BUY DIRECTORY

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Standard Tool Co., Cleveland
Taft-Peirce Mfg. Co., Woonsocket, R. I.
* Tomkins Johnson Co., Jackson, Mich.
* Union Twist Drill Co., Athol, Mass.
Wesson Co., Detroit

CUTTERS, GEAR
* Adams Co., Dubuque, Iowa
Apex Tool & Cutter Co., Shelton, Conn.
* Bantam Ball Bearing Co., S. Bend, Ind.
* Barber-Colman Co., Rockford, Ill.
Bilgram Gear & Machine Works, Philadelphia
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Cleveland Hobbing Machine Co., Cleveland
Cross Gear & Machine Co., Detroit
* Farrel-Birmingham Co., Inc., Buffalo, N. Y.
* Fellows Gear Shaper Co., Springfield, Vt.
* Gleason Works, Rochester, N. Y.
Gould & Eberhardt, Irvington, N. J.
Illinois Tool Works, Chicago
* Lees-Bradner Co., Cleveland
Link-Belt Co., Philadelphia
Michigan Tool Co., Detroit
* Morse Tool Co., Detroit
Morse Twist Drill & Mach. Co., New Bedford, Mass.
National Broach & Machine Co., Detroit
* National Tool Co., Cleveland
* National Twist Drill & Tool Co., Detroit
Niles Tool Works Co., Hamilton, O.
O. K. Tool Co., Shelton, Conn.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Producto Machine Co., Bridgeport, Conn.
* Scherr Co., Geo., N. Y. C.
Standard Tool Co., Cleveland
Stow Mfg. Co., Binghamton, N. Y.
Taylor Machine Co., Cleveland
* Union Twist Drill Co., Athol, Mass.
* Waltham Machine Works, Waltham, Mass.

CUTTERS, Hand Pipe (See **STOCKS, DIES & CUTTERS, Pipe**)

CUTTERS, Keyseater
* Baker Bros., Inc., Toledo, O.
* Barber-Colman Co., Rockford, Ill.
* Brown & Sharpe Mfg. Co., Providence, R. I.
Colonial Broach Co., Detroit
Connecticut Broach & Mach. Co., New London, Conn.
* Davis Keyseater Co., Rochester, N. Y.
* Ex-Cell-O Corp., Detroit
Gibraltar Equipment Mfg. Co., St. Louis
Goddard & Goddard Co., Detroit
Gorham Tool Co., Detroit
Illinois Tool Works, Chicago
Michigan Tool Co., Detroit
* Mitts & Merrill, Saginaw, Mich.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Morton Mfg. Co., Muskegon Heights, Mich.
National Broach & Mach. Co., Detroit
* National Machine Tool Co., Cincinnati
* National Tool Co., Cleveland
* National Twist Drill & Tool Co., Detroit, Mich.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Standard Tool Co., Cleveland
* Union Twist Drill Co., Athol, Mass.

CUTTERS, Milling
* Adams Company, Dubuque, Ia.
Apex Tool & Cutter Co., Shelton, Conn.
* Barber-Colman Co., Rockford, Ill.
* Brown & Sharpe Mfg. Co., Providence, R. I.
Carboloy Co., Inc., Detroit
* Cleveland Twist Drill Co., Cleveland
Colonial Broach Co., Detroit
* Crafts Co., Inc., Arthur A., Boston
Detroit Tap & Tool Co., Detroit
* Disston, Henry & Sons, Philadelphia
Eclipse Counterbore Co., Detroit
* Ex-Cell-O Corp., Detroit
Fansteel Metallurgical Corp., N. Chicago, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
* Gairing Tool Co., Detroit
Gorham Tool Co., Detroit
* Gorton Machine Co., George, Racine, Wis.
* Haynes Stellite Co., N. Y. C.
Illinois Tool Works, Chicago
Ingersoll Milling Mach. Co., Rockford, Ill.
* Kearney & Trecker Corp., Milwaukee
Kelly Reamer Co., Cleveland
* Lovejoy Tool Co., Inc., Springfield, Vt.
Machinists Tool Grinding Co., Chicago
* McCrosky Tool Corp., Meadville, Pa.
* McKenna Metals Co., Inc., Latrobe, Pa.
Michigan Tool Co., Detroit
Midwest Tool & Mfg. Co., Detroit
* Modern Tool Works, Div. Consolidated Mach. Tool Corp., Rochester, N. Y.
* Morse Tool Co., Detroit
Morse Twist Drill & Mach. Co., New Bedford, Mass.
* National Tool Co., Cleveland
* National Twist Drill & Tool Co., Detroit
O. K. Tool Co., Shelton, Conn.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Production Tool Co., Detroit
Putnam Tool Co., Detroit
* Scully Jones & Co., Chicago
Severance Tool Mfg. Co., Saginaw, Mich.
Standard Tool Co., Cleveland
Super Tool Co., Detroit
* Tomkins-Johnson Co., Jackson, Mich.
* Union Twist Drill Co., Athol, Mass.
* Vasceloy-Ramet Corp., N. Chicago, Ill.
Vincent Steel Process Co., Detroit
* Waltham Machine Works, Waltham, Mass.
Weldon Tool Co., Cleveland
Wesson Co., Detroit
Willey's Carbide Tool Co., Detroit
* Williams & Co., J. H., N. Y. C.

CUTTERS, Wire
Crescent Tool Co., Jamestown, N. Y.
Ideal Commutator Dresser Co., Sycamore, Ill.
* Lewis Machine Co., Cleveland
Peck, Stow & Wilcox, Southington, Conn.
Snap-On Tools Corp., Kenosha, Wis.
Shuster Co., F. B., New Haven, Conn.

CUTTING-OFF MACHINES, Abrasive-Wheel
American Instrument Co., Inc., Silver Spring, Md.
Bethlehem Fdry. & Mach. Co., Bethlehem, Pa.
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.
Campbell Div., Andrew C., American Chain & Cable Co., Bridgeport, Conn.
* Catskill Metal Wks., Inc., Catskill, N. Y.
Challenge Machry. Co., Grand Haven, Mich.
Cincinnati Elec. Tool Co., Cincinnati
Cochrane-Bly Co., Rochester, N. Y.
Crescent Machine Co., Leetonia, O.
de Sanno & Sons, Inc., Phoenixville, Pa.
DeWalt Products Corp., Lancaster, Pa.
Mesta Machine Company, Pittsburgh
Oliver Machinery Co., Grand Rapids, Mich.
* Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
* Porter McLeod Machine Tool Co., Inc., Hatfield, Mass.
* Racine Tool & Machine Co., Racine, Wis.
Standard Elec. Tool Co., Cincinnati
Tabor Mfg. Co., Philadelphia
Tannewitz Works, Grand Rapids, Mich.

CYLINDERS, Air (See **TANKS & CYLINDERS, Air**)

CYLINDERS, Hydraulic (See **PRESSES, Hydraulic**)

DAMPENERS, Vibration
Armstrong Cork Prod. Co., Lancaster, Pa.
* Buffalo Forge Co., Buffalo, N. Y.
Felters Co., Inc., Boston
Goodrich, B. F., Co., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Korfund Co., Inc., L. I. City, N. Y.
Sundt Engrg. Co., Chicago

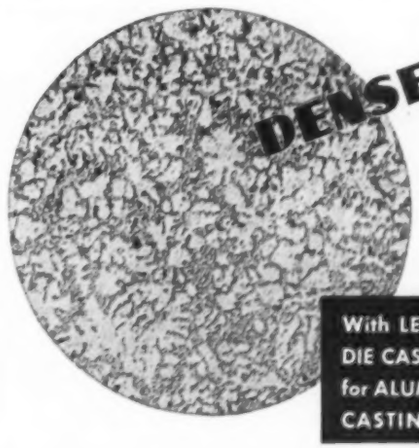
DEMAGNETIZERS
* Acme Tool Co., N. Y. C.
* Abrasive Machine Tool Co., E. Providence, R. I.
Annis Co., R. B., Indianapolis
* Blanchard Machine Co., Cambridge, Mass.
Dickerman Mfg. Co., H. E., Springfield, Mass.
Frampton Elec. Equip. Co., Dayton, O.
* L-W Chuck Co., Toledo, O.
Martindale Electric Co., Cleveland
Taft-Peirce Mfg. Co., Woonsocket, R. I.
* Walker Co., O. S., Worcester, Mass.

DIAMONDS, Industrial
Carboloy Co. Inc., Detroit
* Crafts Co., Inc., Arthur A., Boston
Diamond Drill Carbon Co., N. Y. C.
* Diamond Tool Co., Chicago
Gilmore & Co., F. F., Boston
Hamfen & Co., San Francisco
* Koebel Diamond Tool Co., Detroit
Mogar Industrial Diamond Corp., N. Y. C.
Smit & Sons, Inc., J. K., N. Y. C.

DIE-CASTING MACHINES
* Continental Machines, Inc., Minneapolis
Hannifin Mfg. Co., Chicago
Harvill Inc., H. L., Los Angeles
Kux-Lohner Machine Co., Chicago
Madison-Kipp Corp., Madison, Wis.
Monarch Aluminum Mfg. Co., Cleveland
* Phoenix Mach. Co., Cleveland
* Reed-Prentice Corp., Worcester, Mass.
Victor Die Casting Machine Co., Glendale, Cal.

DIE-HEADS, Threading
Alco Tool Co., Bridgeport, Conn.
* Armstrong Bros. Tool Co., Chicago
Beaver Pipe Tools Inc., Warren, O.
* Butterfield Div. Union Twist Drill Co., Derby Line, Vt.
* Card Mfg. Co., S. W., Mansfield, Mass.
* Eastern Machine Screw Corp., New Haven, Conn.
* Errington Mech. Lab., Stapleton, N. Y.
* Geometric Tool Co., New Haven, Conn.
Gerstner & Sons, H., Dayton, O.
Greenfield Tap and Die Corp., Greenfield, Mass.
* Hill-Acme Co., Cleveland
* Jones & Lamson Machine Co., Springfield, Vt.
* Landis Machine Co., Waynesboro, Pa.
* Modern Tool Works Div., Consolidated Machine Tool Corp., Rochester, N. Y.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
* Murchey Machine & Tool Co., Detroit
* National Acme Co., Cleveland
* National Machry. Co., Tiffin, O.
Oster Mfg. Co., Cleveland
Pipe Machinery Co., Cleveland
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Rickert-Shafer Co., Erie, Pa.
Standard Tool Co., Cleveland
* Union Twist Drill Co., Athol, Mass.
* Warner & Swasey Co., Cleveland
* Winter Bros. Co., Wrentham, Mass.

DIE-MAKERS' SUPPLIES
* Baumbach Mfg. Co., F. A., Chicago
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Carboloy Co., Inc., Detroit
* Cunningham Co., M. E., Pittsburgh
* Danly Mach. Specialties, Inc., Chicago
Dayton-Rogers Mfg. Co., Minneapolis



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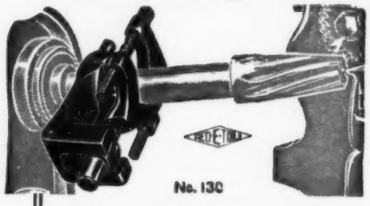

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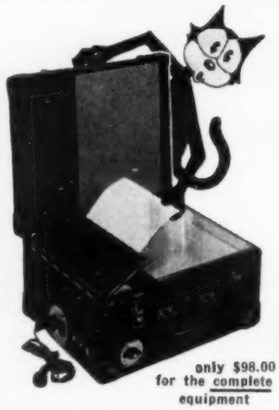

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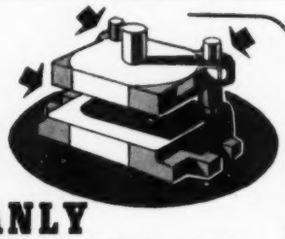

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* Dykem Co., St. Louis
* Fletcher, B. F., Boston
Ford Motor Co., Johannson Div., Dearborn, Mich.
* Producto Machine Co., Bridgeport, Conn.
U. S. Tool Co., Ampere, N. J.

DIE-MAKING & CUTTING MACHINES
Brickner-Kropf Mach. Co., Muskegon Hgts., Mich.
* Cincinnati Milling Machine Co., Cincinnati
Cochrane-Bly Co., Rochester, N. Y.
* Continental Machines, Inc., Minneapolis
Foley Mfg. Co., Inc., Minneapolis
* Gorton Machine Co., Geo., Racine, Wis.
Grob Bros., Grafton, Wis.
Hack Machine Co., Chicago
Harvey Mfg. Corp., N. Y. C.
Illinois Tool Works, Chicago
Ingersoll Milling Mach. Co., Rockford, Ill
Jarvis Co., Chas. L., Middletown, Conn.
* Johnson Tool Co., E. Providence, R. I.
* Marburg Bros., Inc., N. Y. C.
Oliver Machinery Co., Grand Rapids, Mich.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Reed-Prentice Co., Worcester, Mass.

DIE-SETS
* Baumbach Mfg. Co., E. A., Chicago
* Card Mfg. Co., S W, Mansfield, Mass.
* Danly Mach. Specialties, Inc., Chicago
Morse Twist Drill & Machine Co., New Bedford, Mass.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
U. S. Tool Co., Inc., Ampere, N. J.

DIE-SINKING MACHINES
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* Cincinnati Milling Machine Co., Cincinnati
* Gorton Machine Co., George, Racine, Wis.
Heim Co., Fairfield, Conn.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Preis Engraving Mach. Co., H. P., Newark, N. J.
* Producto Machine Co., Bridgeport, Conn.
* Reed-Prentice Corp., Worcester, Mass.

DIES, Marking & Embossing
Acromark Co., Elizabeth, N. J.
* Cunningham Co., M. E., Pittsburgh
Dickey-Grabler Co., Cleveland
Everhot Mfg. Co., Maywood, Ill.
Hanson Co., C. H., Chicago
Markwell Products Co., Kansas City, Mo.
Matthews, Jas. H. & Co., Pittsburgh
New Method Steel Stamps, Inc., Detroit
* Noble & Westbrook Mfg. Co., East Hartford, Conn.
Pannier Bros. Stamp Co., Pittsburgh
Schwerdtle Stamp Co., Bridgeport, Conn.
Spencer Mfg. Co., S. M., Boston

DIES, Screw-Cutting, Adjustable
Alvord-Polk Tool Co., Millersburg, Pa.
Armstrong Co., Bridgeport, Conn.
Brubaker, W. L., & Bros. Co., Millersburg, Pa.
* Butterfield Div. Union Twist Drill Co., Derby Line, Vt.
* Card Mfg. Co., S. W., Mansfield, Mass.
Champion Blower Forge Co., Lancaster, Pa.
* Geometric Tool Co., New Haven, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
* Jones & Lamson Machine Co., Springfield, Vt.
* Landis Machine Co., Waynesboro, Pa.
Mayhew Steel Products, Inc., Shelburne Falls, Mass.
* Modern Tool Wks., Div. Consolidated Machine Tool Corp., Rochester, N. Y.
Morse Twist Drill & Machine Co., New Bedford, Mass.
* Murchey Machine & Tool Co., Detroit
* National Acme Co., Cleveland
* Rickert-Shafer Co., Erie, Pa.
Threadwell Tap & Die Co., Greenfield, Mass.
Whitman & Barnes, Detroit
* Winter Brothers Co., Wrentham, Mass.

DIES, Sheet-Metal & Forging
Brown, R. H., & Co., New Haven, Conn.
City Machine & Tool Co., Toledo, O.
Corley Mfg. Co., Chattanooga, Tenn.
Finkl & Sons, Co., A., Chicago
Gibraltar Equipt. & Mfg. Co., St. Louis
* Globe Machine & Stamping Co., Cleveland
* Hamilton Tool Co., Hamilton, O.
Huot Mfg. Co., St. Paul, Minn.
Marchant, Geo. F., Co., Chicago
National Machine Co., Racine, Wis.
Northern Specialty Co., Utica, N. Y.
Quickwork-Whiting Corp., Harvey, Ill.
Robinson Mfg. Co., Waterbury, Conn.
Rock River Mach. Co., Janesville, Wis.
* Scully Jones & Co., Chicago
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Toledo Pressed Steel Co., Toledo, O.
U. S. Tool Co., Ampere, N. J.
Veeder-Root, Inc., Hartford, Conn.
Whitney Metal Tool Co., Rockford, Ill.
Wrought Washer Mfg. Co., Milwaukee

DIES, Solid Bolt & Pipe
* Armstrong Bros. Tool Co., Chicago
Bath & Co., John, Worcester, Mass.
Beaver Pipe Tools, Inc., Warren, O.
* Butterfield Div. Union Twist Drill Co., Derby Line, Vt.
* Card Mfg. Co., S. W., Mansfield, Mass.
* Consolidated Machine Tool Corp., Rochester, N. Y.
* Geometric Tool Co., New Haven, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Oster Mfg. Co., Cleveland
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Rickert-Shafer Co., Erie, Pa.
U. S. Tool Co., Inc., Ampere, N. J.
Whitman & Barnes, Detroit
* Winter Bros., Wrentham, Mass.

DIES, Sub-Press
* Baumbach Mfg. Co., E. A., Chicago
* Producto Machine Co., Bridgeport, Conn.
U. S. Tool Co., Inc., Ampere, N. J.
* V & O Press Co., Hudson, N. Y.
Verson Allsteel Press Co., Chicago
* Waltham Mach. Works, Waltham, Mass.
Whistler & Sons, S. B., Buffalo, N. Y.

DIES, Wire-Drawing & Extrusion
Ampco Metal Co., Milwaukee
Bliss Co., E. W., Brooklyn, N. Y.
Carboloy Co., Detroit
Cerro de Pasco Copper Corp., N. Y. C.
* Crafts Co., Arthur A., Boston
Driver-Harris Co., Harrison, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Illinois Tool Works, Chicago
Metal Carbides Corp., Youngstown, O.
Taft-Peirce Mfg. Co., Woonsocket, R. I.

DISKS, Abrasive (See **WHEELS, Grinding & Polishing**)

DISKS, Circular Cutting
Atkins & Co., E. C., Indianapolis
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
Morse Twist Drill and Machine Co., New Bedford, Mass.

DIVIDERS (See **CALIPERS & COMPASSES**)

DOGS, Lathe & Milling-Machine
* Armstrong Bros. Tool Co., Chicago
Billings & Spencer Co., Hartford, Conn.
Bonney Forge & Tool Works, Allentown, Pa.
Chicago Tool & Engrg. Co., Chicago
* Cincinnati Lathe & Tool Co., Oakley, Cincinnati
Colmar Bros., South Bend, Ind.
* Hendey Machine Co., Torrington, Conn.
* LeBond Machine Tool Co., R. K., Cincinnati
* Ready Tool Co., Bridgeport, Conn.
* Williams & Co., J. H., N. Y. C.

DRAFTING-ROOM SUPPLIES
Bartusch, A. P., Lockport, N. Y.
Bruning Co., Inc., Chas., N. Y. C.
Curtis 1000 Inc., St. Paul, Minn.
Dietzgen Co., Eugene, Chicago
Dixon Crucible Co., Jersey City, N. J.
Drafto Co., Cochranton, Pa.
Emmert Mfg. Co., Waynesboro, Pa.
Eraser Company, Inc., Syracuse, N. Y.
Faber Co., A. W., Newark, N. J.
Faber Pencil Co., Eberhard, Brooklyn, N. Y.
* Hamilton Mfg. Co., Two Rivers, Wis.
Holliston Mills, Inc., Norwood, Mass.
Keuffel & Esser Co., Hoboken, N. J.
* Kopykat Copy Machine, Philadelphia
Ozalid Corp., N. Y. C.
Paragon-Revolute Corp., Rochester, N. Y.
Pease Co., C. F., Chicago
Post Co., Frederick, Chicago
Universal Drafting Mach. Co., Cleveland
Wade Instrument Co., Cleveland

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Wood-Regan Inst. Co., Nutley, N. J.
Wickes Bros., Saginaw, Mich.
Wright Inc., L. G., Cleveland

DRESSERS, Grinding Wheel
Abrasive Dressing Tool Co., Detroit
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Atkins & Co., E. C., Indianapolis
* Black & Decker Mfg. Co., Towson, Md.
Calder Mfg. Co., Lancaster, Pa.
Carboloy Co., Detroit
* Carborundum Co., Niagara Falls, N. Y.
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* Crafts Co., Arthur A., Boston
Colmar Bros., South Bend, Ind.
* Desmond-Stephen Mfg. Co., Urbana, Ohio
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
Dumore Co., Racine, Wis.
Gilmore & Co., F. F., Boston
Hanchett Mfg. Co., Big Rapids, Mich.
Ideal Commutator Dresser Co., Sycamore, Ill.
Karelsen, Inc., E., N. Y. C.
Kershaw, F. A., Kent, Ohio
* Koebel Diamond Tool Co., Detroit
Lee & Son Co., K. O., Aberdeen, S. D.
Metal Carbides Corp., Youngstown, O.
Norton Co., Worcester, Mass.
Smit & Co., Anton, N. Y. C.
Smit & Sons, J. K., N. Y. C.
Standard Tool Co., Cleveland
Stanley Elec. Tool Div. of Stanley Works, New Britain, Conn.
U. S. Tool Co., Inc., Ampere, N. J.
Victor Machinery Exchange, N. Y. C.
Vincent Steel Process Co., Detroit
Vinco Tool Co., Detroit
Western Tool & Mfg. Co., Springfield, O.
Willey's Carbide Tool Co., Detroit

DRESSING, Belt
American Asphalt Paint Co., Chicago
American Belting Co's., Baltimore, Md.
Bond Co., Chas., Philadelphia
Chicago Belting Co., Chicago
Cling-Surface Co., Buffalo, N. Y.
Dixon Crucible Co., Jersey City, N. J.
Goodrich Co., B. F., Akron, O.
Graton & Knight Co., Worcester, Mass.
Hanchett Mfg. Co., Big Rapids, Mich.
Houghton & Co., E. F., Philadelphia
Rhoads, J. E., & Sons, Philadelphia
* Standard Oil Co. of Calif., San Francisco
Tide Water Associated Oil Co., N. Y. C.
White & Bagley, Worcester, Mass.

DRIERS, Centrifugal
Barrett Co., Leon J., Worcester, Mass.
* DeLaval Separator Co., N. Y. C.
Rochester Engrg. & Centrifugal Corp., Rochester, N. Y.
* Tolhurst Centrifugal Div., American Mach. & Metals Co., E. Moline, Ill.

DRIFTS, Drill
* Armstrong Bros. Tool Co., Chicago
* Cleveland Twist Drill Co., Cleveland
Morse Twist Drill & Machine Co., New Bedford, Mass.
Standard Tool Co., Cleveland
* Williams & Co., J. H., N. Y. C.

DRILL RACKS
Huot Mfg. Co., St. Paul, Minn.

DRILLROD, Steel Tool (See **STEEL, Tool**)

DRILLS, Automatic & Semi-Automatic
Allen Co., Chas. G., Barre, Mass.
* Avey Drilling Machine Co., Cincinnati
* Baker Bros., Inc., Toledo, O.
* Barnes Co., W. F. & John, Rockford, Ill.
* Barnes Drill Co., Rockford, Ill.
* Bodine Corp., Bridgeport, Conn.
Bradford Machine Tool Co., Cincinnati
* Buffalo Forge Co., Buffalo, N. Y.
Buhr Mach. Tool Co., Ann Arbor, Mich.
Canedy-Otto Mfg. Co., Chicago Hgts., Ill.
* Cincinnati-Gilbert Machine Tool Co., Cincinnati
* Cleereman Mach. Tool Co., Green Bay, Wis.
* Consolidated Mach. Tool Corp., Rochester, N. Y.
Cross Gear and Machine Co., Detroit
Davenport Mach. Tool Co., Rochester, N. Y.
* Davis & Thompson Co., Milwaukee
Defiance Machine Works, Defiance, O.
* Ex-Cell-O Corp., Detroit
* Foote-Burt Co., Cleveland
* Fosdick Machine Tool Co., Cincinnati
Fox Machine Co., Jackson, Mich.
* Goss & deLeeuw Machine Co., New Britain, Conn.
Greenlee Bros. & Co., Rockford, Ill.
Ingersoll Milling Mach. Co., Rockford, Ill.
* Kingsbury Machine Tool Co., Keene, N. H.
Langelier Mfg. Co., Providence, R. I.
* Leland-Gifford Co., Worcester, Mass.
* Moline Tool Co., Moline, Ill.
National Automatic Tool Co., Richmond, Ind.
North Bros. Mfg. Co., Philadelphia
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rockford Drilling Machine Co., Rockford, Ill.
Royersford Fdry. & Mach. Co., Inc., Royersford, Pa.
* Snyder Tool & Engrg. Co., Detroit
* Sundstrand Machine Tool Co., Rockford, Ill.
Taylor & Fenn Co., Hartford, Conn.

DRILLS, Bench
Allen Co., Chas. G., Barre, Mass.
Atlas Press Co., Kalamazoo, Mich.
Automatic Machine Co., Bridgeport, Conn.
* Avey Drilling Machine Co., Cincinnati
* Barnes Co., W. F. & John, Rockford, Ill.
Billstrom, Inc., Nels J., Rockford, Ill.
* Black & Decker Mfg. Co., Towson, Md.
* Buffalo Forge Co., Buffalo, N. Y.
Buhr Mach. Tool Co., Ann Arbor, Mich.
Canedy-Otto Mfg. Co., Chicago Hgts., Ill.
Champion Blower & Forge Co., Lancaster, Pa.
* Cincinnati Bickford Tool Co., Oakley, Cincinnati
Cincinnati Elec. Tool Co., Cincinnati
Clark, Jas. Jr., Electric Co., Louisville, Ky.
Delta Mfg. Co., Milwaukee
Dumore Co., Racine, Wis.
Edlund Machine Co., Cortland, N. Y.

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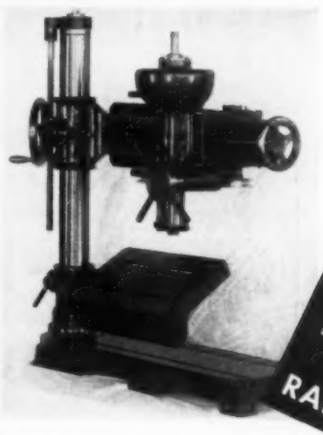

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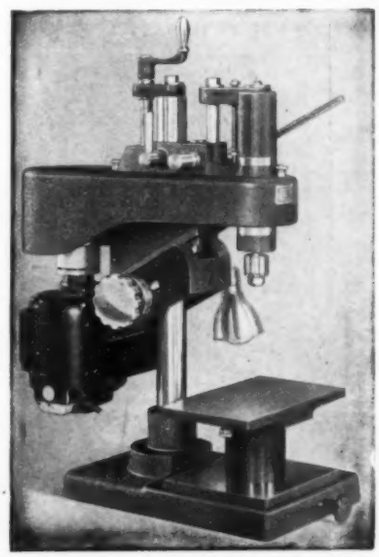

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Min. Spindle Speed 840 — Max. Spindle Speed 2700

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3056 West Meinecke Ave. Milwaukee, Wisconsin

WHERE-TO-BUY DIRECTORY

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DRILLS, Bench (Cont.)
* Foote-Burt Co., Cleveland
* Fosdick Machine Tool Co., Cincinnati
* Hamilton Tool Co., Hamilton, O.
* Henry & Wright Mfg. Co., Hartford, Conn.
High Speed Hammer Co., Inc., Rochester, N. Y.
Langelier Mfg. Co., Cranston, R. I.
* Leland-Gifford Co., Worcester, Mass.
* Moline Tool Co., Moline, Ill.
Munding Mfg. Co., Glendale, Cal.
North Bros. Mfg. Co., Philadelphia
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Production Mach. Co., Greenfield, Mass.
Rockford Drilling Machine Co., Rockford, Ill.
Reed, Francis Co., Greenfield, Mass.
Royersford Fdry. & Mach. Co., Inc., Royersford, Pa.
Ryerson & Son, Jos. T., Chicago
* Schauer Mach. Co., Cincinnati
* Skilsaw, Inc., Chicago
Standard Electrical Tool Co., Cincinnati
Stanley Electrical Tool Div., Stanley Wks., New Britain, Conn.
Taylor & Fenn Co., Hartford, Conn.
* Taylor Mfg. Corp., Milwaukee
U. S. Electrical Tool Co., Cincinnati
U. S. Automatic Box Machry. Co., Roslindale, Mass.
* Van Dorn Elec. Tool Co., Towson, Md.
* Walker-Turner Co., Plainfield, N. J.

DRILLS, Breast (See **TOOLS, Hand**)

DRILLS, Center
* Cleveland Twist Drill Co., Cleveland
Firth-Sterling Steel Co., McKeesport, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
Morse Twist Drill and Machine Co., New Bedford, Mass.
* National Twist Drill & Tool Co., Detroit
* Pratt & Whitney Co., Div. Niles-Bement-Pond Co., Hartford, Conn.
* Slocomb Co., J. T., Providence, R. I.
Standard Tool Co., Cleveland
Super Tool Company, Detroit
* Union Twist Drill Co., Athol, Mass.
* Victor Machinery Exchange, N. Y. C.
Whitman & Barnes, Detroit

DRILLS, Column-Type
Allen Co., Chas. G., Barre, Mass.
* Baker Bros., Inc., Toledo, O.
* Barnes Drill Co., Rockford, Ill.
* Barnes Co., W. F. & John, Rockford, Ill.
Billstrom, Inc., Nels J., Rockford, Ill.
* Buffalo Forge Co., Buffalo, N. Y.
* Cincinnati-Bickford Tool Co., Oakley, Cincinnati
* Cincinnati-Gilbert Machine Tool Co., Cincinnati
* Cleereman Machine Tool Co., Chicago
* Consolidated Machine Tool Corp., Rochester, N. Y.
* Dalzen Tool & Mfg. Co., Detroit
* Davis & Thompson Co., Milwaukee
Defiance Machine Works, Defiance, O.
Edlund Machine Co., Cortland, N. Y.
* Foote-Burt Co., Cleveland
* Fosdick Machine Tool Co., Cincinnati
Ingersoll Milling Mach. Co., Rockford, Ill.
* Leland-Gifford Co., Worcester, Mass.
LeMaire Tool & Mfg. Co., Dearborn, Mich.
* Moline Tool Co., Moline, Ill.
National Automatic Tool Co., Richmond, Ind.
Niles Tool Works Co., Hamilton, O.
Rockford Drilling Machine Co., Rockford, Ill.
Royersford Fdry. & Mach. Co., Inc., Royersford, Pa.
* Sibley Machine Co., South Bend, Ind.
* Snyder Tool & Engrg. Co., Detroit
Taylor Mfg. Co., Milwaukee

DRILLS, Core
Carboloy Co., Detroit
Eclipse Counterbore Co., Detroit
* Ex-Cell-O Corp., Detroit
Firth-Sterling Steel Co., McKeesport, Pa.
* Gairing Tool Co., Detroit
Gorham Tool Co., Detroit
* Haynes Stellite Co., N. Y. C.
Morse Twist Drill & Machine Co., New Bedford, Mass.
* National Twist Drill & Tool Co., Detroit
Production Tool Co., Detroit
Putnam Tool Co., Detroit
* Scully Jones & Co., Chicago
Standard Tool Co., Cleveland
Super Tool Company, Detroit
* Union Twist Drill Co., Athol, Mass.
Wesson Co., Detroit
Whitman & Barnes, Detroit

DRILLS, Flat (See **DRILLS, Twist & Flat**)

DRILLS, Hand (See **TOOLS, Hand**)

DRILLS, Horizontal
Allen Co., Chas. G., Barre, Mass.
* Avey Drilling Machine Co., Cincinnati
Baird Machine Co., Bridgeport, Conn.
* Baker Bros. Inc., Toledo, Ohio
* Barnes Co., W. F. & John, Rockford, Ill.
* Baush Machine Tool Co., Springfield, Mass.
Bradford Machine Tool Co., Cincinnati
Buhr Machine Tool Co., Ann Arbor, Mich.
* Cincinnati-Gilbert Machine Tool Co., Cincinnati
* Consolidated Machine Tool Corp., Rochester, N. Y.
Defiance Machine Works, Defiance, O.
* Foote-Burt Co., Cleveland
* Fosdick Machine Tool Co., Cincinnati
Fox Machine Co., Jackson, Mich.
Frew Machine Co., Philadelphia
* Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
Hole Engrg. Service, Detroit
Ingersoll Milling Mach. Co., Rockford, Ill.
* Kingsbury Machine Tool Co., Keene, N. H.
Langelier Mfg. Co., Providence, R. I.
* Leland-Gifford Co., Worcester, Mass.
* Moline Tool Co., Moline, Ill.
* Murchey Machine and Tool Co., Detroit
National Auto. Tool Co., Richmond, Ind.
Niles Tool Works Co., Hamilton, O.
Partool Mach. Co., Detroit
Rockford Drilling Mach. Co., Rockford, Ill.
Ryerson & Son, Jos. T., Chicago
* Sellers & Co., Inc., Wm., Philadelphia
* Snyder Tool & Engrg. Co., Detroit
Universal Boring Machine Co., Hudson, Mass.

DRILLS, Deep-Hole
* Barnes Co., W. F. & John, Rockford, Ill.
Builders Iron Foundry Co., Providence, R. I.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.

DRILLS, Multi-Spindle or Gang
Allen Co., Chas. G., Barre, Mass.
Automatic Machine Co., Bridgeport, Conn.
* Avey Drilling Machine Co., Cincinnati
* Baker Bros. Inc., Toledo, O.
Baird Machine Co., Bridgeport, Conn.
* Barnes Co., W. F. & John, Rockford, Ill.
* Barnes Drill Co., Rockford, Ill.
* Baush Machine Tool Co., Springfield, Mass.
* Bodine Corp., Bridgeport, Conn.
Bradford Machine Tool Co., Cincinnati
* Buffalo Forge Co., Buffalo, N. Y.
Buhr Machine Tool Co., Ann Arbor, Mich.
Canedy-Otto Mfg. Co., Chicago Hgts., Ill.
Champion Blower & Forge Co., Lancaster, Pa.
* Cincinnati Bickford Tool Co., Oakley, Cincinnati, O.
* Cleereman Mach. Tool Co., Green Bay, Wis.
* Consolidated Machine Tool Corp., Rochester, N. Y.
* Davis & Thompson Co., Milwaukee
Defiance Machine Works, Defiance, O.
Delta Mfg. Co., Milwaukee
* Ex-Cell-O Corp., Detroit
* Foote-Burt Co., Cleveland
* Fosdick Machine Tool Co., Cincinnati
Fox Machine Co., Jackson, Mich.
* Grant Mfg. and Machine Co., Bridgeport, Conn.
Greenlee Bros. & Co., Rockford, Ill.
* Hamilton Tool Co., Hamilton, O.
* Henry & Wright Mfg. Co., Hartford, Conn.
High Speed Hammer Co., Inc., Rochester, N. Y.
Hoefer Mfg. Co., Freeport, Ill.
Index Machinery Corp., Cincinnati
Ingersoll Milling Mach. Co., Rockford, Ill.
* Kingsbury Machine Tool Co., Keene, N. H.
Langelier Mfg. Co., Providence, R. I.
* Leland-Gifford Co., Worcester, Mass.
* Moline Tool Co., Moline, Ill.
National Automatic Tool Co., Richmond, Ind. (Turret type also).
Niles Tool Works Co., Hamilton, O.
Partool Mach. Co., Detroit
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rockford Drilling Machine Div., Borg-Warner Corp., Rockford, Ill.
Royersford Fdry. & Mach. Co., Inc., Royersford, Pa.
* Scherr Co., Geo., N. Y. C.
Sigourney Tool Co., Hartford, Conn.
* Snyder Tool & Engrg. Co., Detroit
Taylor & Fenn Co., Hartford, Conn.
Thomas Machine Mfg. Co., Pittsburgh

DRILLS, Portable Electric (See **TOOLS, Portable Electric**)

DRILLS, Portable Pneumatic (See **TOOLS, Portable Pneumatic**)

DRILLS, Radial
* American Tool Works Co., Cincinnati
* Carlton Machine Co., Cincinnati
* Cincinnati Bickford Tool Co., Oakley, Cincinnati
* Cincinnati-Gilbert Machine Tool Co., Cincinnati
* Cleveland Punch & Shear Works, Inc., Cleveland
* Fosdick Machine Tool Co., Cincinnati
* Hammond Mfg. Co., Cleveland
Heller Machine Co., N. Y. C.
* Leland-Gifford Co., Worcester, Mass.
* Moore Machinery Co., San Francisco
* Morris Machine Tool Co., Cincinnati
Niles Tool Works Co., Hamilton, O.
Western Mach. Tool Wks., Holland, Mich.

DRILLS, Sensitive
Allen Co., Chas. G., Barre, Mass.
Atlas Press Co., Kalamazoo, Mich.
* Avey Drilling Machine Co., Cincinnati
Billstrom, Inc., Nels J., Rockford, Ill.
Boice-Crane Co., Toledo, Ohio
* Buffalo Forge Co., Buffalo, N. Y.
Buhr Mach. Tool Co., Ann Arbor, Mich.
Canedy-Otto Mfg. Co., Chicago Hgts., Ill.
Champion Blower & Forge Co., Lancaster, Pa.
Clark Jr. Elec. Co., James, Louisville, Ky.
* Cleereman Machine Tool Co., Chicago
* Dalzen Tool & Mfg. Co., Detroit
Delta Mfg. Co., Milwaukee
Dumore Co., Racine, Wis.
* Foote-Burt Co., Cleveland
* Fosdick Machine Tool Co., Cincinnati
* Hamilton Tool Co., Hamilton, O.
* Henry & Wright Mfg. Co., Hartford, Conn.
High Speed Hammer Co., Inc., Rochester, N. Y.
* Kingsbury Mach. Tool Corp., Keene, N. H.
Langelier Mfg. Co., Providence, R. I.
* Leland-Gifford Co., Worcester, Mass.
National Auto. Tool Co., Richmond, Ind.
Partool Mach. Co., Detroit
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Production Machine Co., Greenfield, Mass.
Royersford Fdry. & Mach. Co., Royersford, Pa.
* Scherr Co., Geo., N. Y. C.
* Sibley Machine Co, South Bend, Ind.
Sigourney Tool Co., Hartford, Conn.
Stark Tool Co., Waltham, Mass.
Taylor & Fenn Co., Hartford, Conn.
* Taylor Mfg. Corp., Milwaukee
Toledo General Mfg. Co., Toledo, O.
U. S. Automatic Box Machry. Co., Roslindale, Mass.
* Walker-Turner Co., Inc., Plainfield, N. J.

DRILLS, Twist & Flat
American Twist Drill & Tool Co., Detroit
Carboloy Co., Detroit
* Cleveland Twist Drill Co., Cleveland
Cogsdill Twist Drill Co., Inc., Detroit
Firth-Sterling Steel Co., McKeesport, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
* Grobet File Corp. of Amer., N. Y. C.
* Morse Tool Co., Detroit
Morse Twist Drill & Machine Co., New Bedford, Mass.
* National Twist Drill & Tool Co., Detroit
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Scully-Jones & Co., Chicago
Standard Tool Co., Cleveland
* Union Twist Drill Co., Athol, Mass.
* Victor Machinery Exchange, N. Y. C.
Wesson Co., Detroit
Whitman & Barnes, Detroit

DRIVES, Machine
Atlas Press Co., Kalamazoo, Mich.
* Cincinnati Lathe & Tool Co., Oakley, Cincinnati
Cleveland Electric Motor Co., Cleveland
* Cullman Wheel Co., Chicago
Dayton Rubber Mfg. Co., Dayton, O.
Drive-All Mfg. Co., Detroit
Hardinge Brothers, Inc., Elmira, N. Y.
Lima Armature Works, Lima, O.
Lima Electric Motor Co., Lima, O.
Master Electric Co., Dayton, O.

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CINCINNATI, OHIO

WHERE-TO-BUY DIRECTORY

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* Reed-Prentice Co., Worcester, Mass.
* Reliance Elec. & Engrg. Co., Cleveland
Remco Products Corp., York, Pa.
* Rivett Lathe & Grinders Inc., Brighton, Boston
* Sebastian Lathe Co., Cincinnati
* Sheldon Mach. Co., Chicago
Stark Tool Company, Waltham, Mass.
Turner-Uni-Drive Co. Sales Div. Turner Machinery Co., Kansas City, Mo.
U. S. Electrical Mfg. Co., Chicago
Western Mfg. Co., Detroit
Westlof Tool Co., Detroit

DRIVES, Variable-Speed (See **TRANSMISSIONS, Variable-Speed**)

DRIVES, "V"-Belt
Allis-Chalmers Mfg. Co., Milwaukee
American Pulley Co., Philadelphia
Bond Co., Chas., Philadelphia
Dayton Rubber Mfg. Co., Dayton, O.
Dodge Mfg. Corp., Mishawaka, Ind.
Fairbanks-Morse Co., Chicago
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Medart Co., St. Louis
Raybestos-Manhattan, Inc., Passaic, N. J.
Rockwood Mfg. Co., Indianapolis
Stephens-Adamson Mfg. Co., Aurora, Ill.
Worthington Pump & Machy. Corp., Harrison, N. J.

DRIVES, Worm
* Adams Company, Dubuque, Iowa
Bilgram Gear & Machine Works, Philadelphia
Boston Gear Works, Inc., N. Quincy, Mass.
Chicago Rawhide Mfg. Co., Chicago
Colonial Broach Co., Detroit
Crofoot Gear Corp., Chas. E., S. Easton, Mass.
DeLaval Steam Turbine Co., Trenton, N. J.
Detroit Tap & Tool Co., Detroit
* Earle Gear & Mach. Co., Philadelphia
* Ganschow Gear Co., Chicago
* Gear Specialties, Inc., Chicago
* Grant Gear Works, Boston
Lempco Products, Inc., Bedford, O.
Link-Belt Company, Philadelphia
Michigan Tool Co., Detroit
* Perkins Machine & Gear Co., Springfield, Mass.
Philadelphia Gear Works, Philadelphia
Smith, Inc., Winfield H., Springville, Erie County, N. Y.

DRYING Machines (See **MACHINES, Washing and Drying**)

DUPLICATORS (See **DIE SINKERS**)

DYNAMOMETERS, Hydraulic
Chatillon & Sons, John, N. Y. C.
* Taylor Mfg. Co., Milwaukee

ELECTRODES, Welding
Air Reduction Sales Co., N. Y. C.
* Aluminum Co. of America, Pittsburgh
American Brass Co., Waterbury, Conn.
American Manganese Steel Div., Chicago Hgts., Ill.
* American Steel & Wire Co., Cleveland
Ampco Metal Inc., Milwaukee
Bastian-Blessing Co., Chicago
* General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., Milwaukee
* Haynes-Stellite Co., N. Y. C.
Lee & Son, K. O., Aberdeen, S. D.
* Lincoln Electric Co., Cleveland
Linde Air Products Co., Inc., N. Y. C.
McKay Co., Pittsburgh, Pa.
Metal & Thermit Corp., N. Y. C.
National Cylinder Gas Co., Chicago
* Page Steel & Wire Div., Am. Chain & Cable Co., Monessen, Pa.
* Roebling's, John A., Sons Co., Trenton, N. J.
Ryerson & Son, Inc., Jos. T., Chicago
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.
Welding Timer Mfg. Co., Newark, N. J.
* Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
Wickwire Spencer Steel Co., N. Y. C.
Wilson Welder & Metals Co., N. Y. C.

ELEVATORS, PILERS, or STACKERS, Portable
Barrett-Cravens Co., Chicago
Jeffrey Mfg. Co., Columbus, O.
Lewis-Shepard Sales Corp., Watertown, Mass.
Link-Belt Co., Chicago
Revolvator Co., N. Bergen, N. J.
Service Caster & Truck Co., Albion, Mich.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Yale & Towne Mfg. Co., Philadelphia

ENAMELING & GALVANIZING MACHINES, Centrifugal
Barrett Co., Leon J., Worcester, Mass.
* Tolhurst Centrifugals Div., Am. Mach. & Metals, Inc., E. Moline, Ill.

ENAMELS (See **PAINTS, VARNISHES, etc.**)

ENGRAVING MACHINES
Eitzen Co., Louis C., N. Y. C.
* Gorton Machine Co., Geo., Racine, Wis.
Ideal Commutator Dresser Co., Sycamore, Ill.
Micro Instrument Co., Cambridge, Mass.
Preis Engraving Machine Co., H. P., Newark, N. J.
* Reed-Prentice Co., Worcester, Mass.

ETCHERS, Electric
* Acme Tool Co., N. Y. C.
Annis Co., R. B., Indianapolis
Brewster & Squires, N. Y. C.
Golden Gate Tool Co., San Francisco
Ideal Commutator Dresser Co., Sycamore, Ill.

EXTRACTORS, Broken-Tap
Walton Co., Hartford, Conn.

EXTRACTORS, Centrifugal Oil (See **SEPARATORS, Centrifugal**)

EXTRACTORS, Screw
* Cleveland Twist Drill Co., Cleveland
Greenfield Tap & Die Corp., Greenfield, Mass.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Standard Tool Co., Cleveland

EXTRACTORS, Screw Pipe
Ridge Tool Co., Elyria, O.

FANS, Man-Cooler (See **BLOWERS**)

FASTENERS, Lacing & Clamps, Belt
Armstrong-Bray & Co., Chicago
Bristol Co., Waterbury, Conn.
Chicago Rawhide Mfg. Co., Chicago
Clipper Belt Lacer Co., Grand Rapids, Mich.
Crescent Belt Fastener Co., N. Y. C.
Detroit Belt Lacer Co., Detroit
Dodge Mfg. Corp., Mishawaka, Ind.
Flexible Steel Lacing Co., Chicago
Graton & Knight Co., Worcester, Mass.
* Greene, Tweed & Co., N. Y. C.
Jackson, Isaac, Belt Fastener Co., N. Y. C.
* Republic Steel Corp., Cleveland
Rhoads & Sons, J. E., Philadelphia
Safety Belt Lacer Co., Toledo, O.
Shippert Mfg. Co., Dixon, Ill.

FEEDS, Die (See **FEEDS, Press**)

FEEDS, Hydraulic
American Engineering Co., Philadelphia
* Ex-Cell-O Tool Corp., Detroit
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Le Maire Tool & Mfg. Co., Dearborn, Mich.
Logansport Machine, Inc., Logansport, Ind.
* Oilgear Co., Milwaukee
* Sundstrand Mach. Tool Co., Rockford, Ill.
* Vickers, Inc., Detroit

FEEDS, Press
Buss Co., E. W., Brooklyn, N. Y.
Dickerman Mfg. Co., H. E., Springfield, Mass.
* Federal Press Co., Elkhart, Ind.
Henderson Machine Co., Philadelphia
* Henry & Wright Mfg. Co., Hartford, Conn.
* Littell Machine Co., F. J., Chicago
Logansport Machine, Inc., Logansport, Ind.
* Perkins Machine Co., Warren, Mass.
* Producto Machine Co., Bridgeport, Conn.
U. S. Tool Co., Ampere, N. J.
* V. & O. Press Co., Hudson, N. Y.
Walsh Press & Die Co., Chicago
Waterbury-Farrel Foundry & Mach. Co., Waterbury, Conn.
Yoder Co., Cleveland
Zeh & Hahnemann Co., Newark, N. J.

FELT, Mechanical
Aetna Felt Co., N. Y. C.
American Felt Co., N. Y. C.
Armstrong Cork Co., Lancaster, Pa.
Booth Felt Co., Brooklyn, N. Y.
Brawley Felt Co., Brooklyn, N. Y.
Continental Felt Co., N. Y. C.
Felters Co., Boston
Fidelity Felt Co., Philadelphia
House & Sons, Chas. W., N. Y. C.
Pacific States Felt & Mfg. Co., San Francisco
Western Felt Works, Chicago

FILE BANDS
Do All Co., Inc., Des Plaines, Ill.
Grobet File Corp. of America, N. Y. C.

FILES & RASPS
* American Swiss File & Tool Co., Elizabeth, N. J.
Atkins & Co., E. C., Indianapolis
Carson Newton Co., Belleville, N. J.
Delta File Works, Philadelphia
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
* Grobet File Corp. of America, N. Y. C.
Heller Bros. Co., Newark, N. J.
* Nicholson File Co., Providence, R. I.
* Oliver Instrument Co., Adrian, Mich.
* Pratt & Whitney Div. Niles-Bement-Pond Co. Hartford, Conn.
Severance Tool Mfg. Co., Saginaw, Mich.
Simonds Saw & Steel Co., Fitchburg, Mass.
Stow Mfg. Co., Inc., Binghamton, N. Y.
* Strand & Co., N. A., Chicago

FILES, Rotary
* Disston, Henry & Sons, Inc., Tacony, Philadelphia
Ford, M. A., Mfg. Co., Davenport, Ia.
* Grobet File Corp. of America, N. Y. C.
* Hamilton Tool Co., Hamilton, O.
Hayes File Co., Detroit
Jarvis, Chas. L., Co., Middletown, Conn.
Mall Tool Co., Chicago
Martindale Electric Co., Cleveland
Murcott & Campbell, Inc., Bklyn, N. Y.
Sandvik Saw & Tool Corp., N. Y. C.
Severance Tool Mfg. Co., Saginaw, Mich.
* Strand, N. A., & Co., Chicago
U. S. Electrical Tool Co., Cincinnati

FILING MACHINES, Die
* Ames Co., B. C., Waltham, Mass.
Cochrane-Bly Co., Rochester, N. Y.
* Continental Machines Inc., Milwaukee
Do All Co., Inc., Des Plaines, Ill.
Grob Bros., Grafton, Wis.
Illinois Tool Co., Chicago
* Oliver Instrument Co., Adrian, Mich.

FILING MACHINES, Portable
Chicago Wheel & Mfg. Co., Chicago
H & H Research, Detroit

FILMS, Educational
Castle Films, N. Y. C.
Jam Handy, Detroit

FILTERS, Air
American Air Filter Co., Louisville, Ky.
American Blower Corp., Detroit
American Fdry. Equip. Co., Mishawaka, Ind.
Bastian-Blessing Co., Chicago
Binks Mfg. Co., Chicago
Cincinnati Elec. Tool Co., Cincinnati
* Cleveland Pneu. Tool Co., Cleveland
Cuno Engrg. Corp., Meriden, Conn.
Curtis Pneu. Mach. Co., St. Louis
DeVilbiss Company, Toledo, O.
Felters Co., Boston
Fostoria Pressed Steel Co., Fostoria, O.
Marshalltown Mfg. Co., Marshalltown, Ia.
Mine Safety App. Co., Pittsburgh
Norton Company, Worcester, Mass.
Owens-Illinois Glass Co., Toledo, O.
Standard Elec. Tool Co., Cincinnati
Sterling Products Co., Detroit

FILTERS, Oil & Coolant
AC Spark Plug Div., General Motors Corp., Detroit
Bowser, S. F., & Co., Fort Wayne, Ind.
Cuno Engineering Co., Meriden, Conn.
Detroit Lubricator Co., Detroit
Fauver Co., J. N., Detroit
Felters Co., Inc., Boston
Fostoria Pressed Steel Co., Fostoria, O.
Goulds Pumps Inc., Seneca Falls, N. Y.
Motor Improvements, Inc., Newark, N. J.

FINGERS, Feed
Davenport Mach. Tool Co., Rochester, N. Y.
* Eastern Machine Screw Corp., New Haven, Conn.
Hardinge Brothers, Inc., Elmira, N. Y.
Luers, J. Milton, Detroit

1905 **Strand** FLEXIBLE SHAFTS 1942

Flexible Shafts and Machines

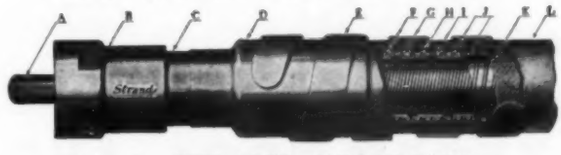
1-8 TO 3 H.P.

ROTARY FILES

GROUND CUTTERS

Polishing Stainless Steel Sinks

HIGH QUALITY FLEXIBLE SHAFTS



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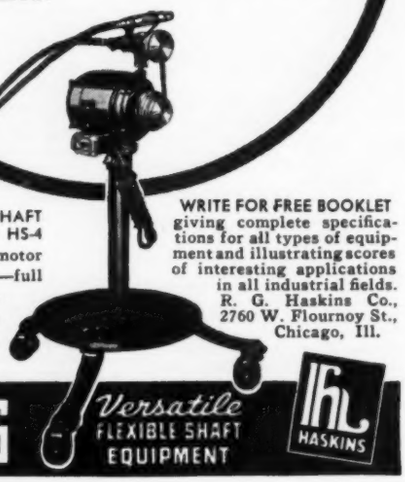
5001 North Wolcott Avenue CHICAGO

MORE JOBS—FASTER!

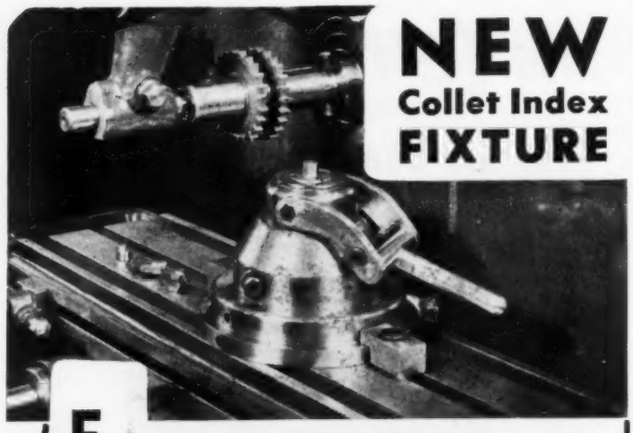
There are *30 different types* of Haskins Flexible Shaft Equipment to do *all kinds* of grinding, filing and buffing jobs *faster and more economically than they've ever been done before!* Equipment with direct and multi-speed countershaft drives. With pedestal, bench, truck and ceiling-suspended mountings. With motor ratings from ¼ to 1½ HP. Look to this *really complete* line for the money-saving equipment *you* need!



HASKINS FLEXIBLE SHAFT EQUIPMENT TYPE HS-4
½ HP, ball bearing motor —6-speed countershaft—full ball bearing spindle adapted to use free running taper shanks.

WRITE FOR FREE BOOKLET giving complete specifications for all types of equipment and illustrating scores of interesting applications in all industrial fields.
R. G. Haskins Co.,
2760 W. Flournoy St.,
Chicago, Ill.

HASKINS *Versatile* FLEXIBLE SHAFT EQUIPMENT — HASKINS



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FOR RAPID PRODUCTION ON SECOND OPERATION WORK...

Mounts on Face Plates or Tables . . . Has wide application

TWO SIZES— 1" and 2"

- Standard W. & S. Collets Or Can Be Furnished to Fit Customer's Collets

On Milling Machines, Lathes, Internal Grinders, External Grinders, Drill Presses, Gear Shapers and Screw Machines.

Accuracy Guaranteed. All parts hardened and ground.

Write for Complete Information

ZAGAR TOOL, INC.
23880 Lakeland Boulevard, Cleveland, Ohio

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

FINGERS, Feed (Cont.)
* Mitts & Merrill, Saginaw, Mich.
Morrison Mach. Prod. Div., Elmira, N. Y.
* Rivett Lathe & Grinders, Inc., Boston

FITTINGS, Hydraulic
Graf Co., L. V., Detroit
* Watson-Stillman Co., Roselle, N. J.

FITTINGS, Wire-Rope
* American Chain & Cable Co., Bridgeport, Conn.
* American Steel & Wire Co. (Subsidiary U. S. Steel Corp.), Chicago
Bethlehem Steel Co., Bethlehem, Pa.
Burndy Engrg. Co., N. Y. C.
* Republic Steel Corp., Cleveland
* Roebling's & Sons Co., John A., Trenton, N. J.
Upson-Walton Co., Cleveland
* Williams & Co., J. H., N. Y. C.

FIXTURES, Indexing
* Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Universal Jig Co., Cleveland
* Hartford Special Machinery Co., Hartford, Conn.
* Stevens, Inc., John B., N. Y. C.
* Zagar Tool, Inc., Cleveland

FIXTURES, Saw Regrinding
Covel-Hanchett Co., Big Rapids, Mich.
Industrial Engrg. Co., Inc., Minneapolis

FLAME-CUTTING MACHINES
Air Reduction Sales Corp., N. Y. C.
Compressed Industrial Gases, Inc., Chicago
Linde Air Products Co., N. Y. C.
National Cylinder Gas Co., Chicago
Oster Mfg. Co., Cleveland
Schrader Bowers Co., Mishawaka, Ind.

FLEXIBLE SHAFT EQUIPMENT
* Acme Tool Co., N. Y. C.
* Hoskins Mfg. Co., R. G., Chicago
Morris, Ltd., B. O., Birmingham, England
* Strand Mfg. Co., N. A., Chicago
U. S. Electrical Tool Co., Cincinnati
White Dental Mfg. Co., S. S., N. Y. C.

FLUORESCENT LIGHTING
Fleurolier Mfrs., Cleveland
* General Electric Co., Cleveland
Miller Co., The, Meriden, Conn.
* Westinghouse Elec. & Mfg. Co., Lighting Div., Cleveland

FLUX, Liquid & Paste, Soldering & Brazing
Air Reduction Sales Co., N. Y. C.
Allen Co., L. B., Chicago
Atkins, E. C. & Co., Indianapolis
Bastian-Blessing Co., Chicago
Benson Co., Alex R., Hudson, N. Y.
Eutectic Welding Alloys, Inc., N. Y. C.
Garden City Laboratory, Chicago
Handy & Harman, N. Y. C.
Hardy, Inc., Chas., N. Y. C.
Imperial Brass Mfg. Co., Chicago
Linde Air Products Co., N. Y. C.
McGill Mfg. Co., Valparaiso, Ind.
Ruby Chemical Co., Columbus, O.
Wayne Chemical Products Div. Wayne Soap Co., Detroit

FLUX, Welding
Air Reduction Sales Co., N. Y. C.
Allen, L. B., Co., Inc., Chicago
Anti-Borax Compound Co., Fort Wayne, Ind.
Bastian-Blessing Co., Chicago
Buchanan Chemical Co., C. G, Norwood, Cincinnati
Chapin Co., W. R., Indianapolis
Colmonoy, Inc., Los Nietos, Calif.
Consolidated Metal Corp., Detroit
Eutectic Welding Alloys, Inc., N. Y. C.
Imperial Brass Mfg. Co., Chicago
K-G Welding & Cutting Co., Inc., N. Y. C.
* Lincoln Electric Co., Cleveland
Linde Air Products Co., N. Y. C.
Modern Engineering Co., St. Louis
Smith Welding Equip. Corp., Minneapolis
Stewart, Park Co., Aspinwall, Pa.
Torchweld Equipment Co., Chicago
Victor Equipt. Co., San Francisco

FORGING MACHINES (See also PRESSES, Forging)
* Ajax Mfg. Co., Euclid, Cleveland
Chambersburg Eng. Co., Chambersburg, Pa.
Elmes Engrg. Wks., Chas. F., Chicago
Erie Foundry Co., Erie, Pa.
* Hill-Acme Co., Cleveland
Lake Erie Engrg. Corp., Buffalo, N. Y.
Mesta Machine Co., Pittsburgh
* National Machinery Co., Tiffin, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

FORMING Machines
* Ajax Mfg. Co., Euclid, Cleveland
Baird Machine Co., Bridgeport, Conn.
Bliss Co., E. W., Brooklyn, N. Y.
Chambersburg Engrg. Co., Chambersburg, Pa.
* Cincinnati Shaper Co., Cincinnati
* Cleveland Punch & Shear Works Co., Cleveland
* Consolidated Mach. Tool Corp., Rochester, N. Y.
Elmes Engrg. Works, Chas F., Chicago
Engrg. & Research Corp., Riverdale, Md.
* Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hannifin Mfg. Co., Chicago
* Henry & Wright Mfg. Co., Hartford, Conn.
Hydraulic Press Mfg. Co., Mt. Gilead, O
Kane & Roach Inc., Syracuse, N. Y.
Lewis Machine Co., Cleveland
* Marburg Bros., Inc., N. Y. C.
Mesta Machine Co., Pittsburgh
* Niagara Mach. & Tool Wks., Buffalo, N. Y.
Nilson Machine Co., A. H., Bridgeport, Conn.
Peck, Stow & Wilcox Co., Southington Conn.
Quickwork-Whiting Corp., Harvey, Ill.
Rafter Machine Co., Belleville, N. J.
Robertson Co., John, Brooklyn, N. Y.
* Schatz Mfg. Co., Poughkeepsie, N. Y.
Sleeper & Hartley, Worcester, Mass.
United Engrg. & Fdry. Co., Pittsburgh
U. S. Tool Co., Ampere, N. J.
* Watson-Stillman Co., Roselle, N. J.
Whitney Metal Tool Co., Rockford, Ill.
Williams, White & Co., Moline, Ill.
Yoder Co., Cleveland
* Zeh & Hahnemann Co., Newark, N. J.

FURNACES, Electric
Ajax Electric Co., Philadelphia
Ajax Electrothermic Corp., Trenton, N. J.
American Car & Foundry Co., N. Y. C.

STEVENS ROTARY TABLES
STANDARD AND DIAL TYPES

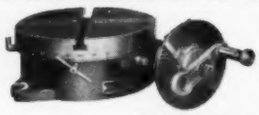

Table graduated for single degree reading. Precision and accuracy. Thirty years' experience designing circular attachments.
Write for circular.
Four sizes; two types of each.
JOHN B. STEVENS, INC.
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Giant KEYSEATERS

For cutting internal keyways, slots or splines 1/16" to 4" wide and up to 60" long. Fast—Accurate—Flexible. Write for particulars and catalog on machine for your work.

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913 Tilden St.
Saginaw, Michigan

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Baker & Co., Inc., Newark, N. J.
Bellis Heat Treating Co., Branford, Conn.
Continental Industrial Engineers, Inc., Chicago
* Electric Furnace Co., Salem, O.
Gas Machinery Co., Cleveland
* General Electric Co., Schenectady, N. Y.
Gordon Co., Claud S., Chicago
Hayes, Inc., C. I., Providence, R. I.
Hevi-Duty Electric Co., Milwaukee
Holcroft & Co., Detroit
Hoskins Mfg. Co., Detroit
Leeds & Northrup Co., Philadelphia
Lindberg Engineering Co., Chicago
Philadelphia Drying Machinery Co., Philadelphia
* Rockwell Co., W. S., N. Y. C.
Sentry Co., Foxboro, Mass.
Stark Tool Co., Waltham, Mass.
Surface Combustion Corp., Toledo, O.
Swoboda, Inc., H. O., Pittsburgh
Trent Co., Harold E., Philadelphia
* Westinghouse Electric & Mfg. Co., E. Pittsburgh

FURNACES, Gas
* American Gas Furnace Co., Elizabeth, N. J.
Continental Industrial Engineers, Inc., Chicago
Dempsey Industrial Furnace Co., Springfield, Mass.
Despatch Oven Co., Minneapolis
* Electric Furnace Co., Salem, Ohio
Gas Machinery Co., Cleveland
Holden Co., A. F., New Haven, Conn.
* Hones, Inc., Chas. A., Baldwin, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Lindberg Engrg. Co., Chicago
* Strong, Carlisle & Hammond Co., Cleveland
Surface Combustion Corp., Toledo, O.

FURNACES, Oil
Bellevue Industrial Furnace Co., Detroit
Continental Industrial Engrs., Inc., Chicago
Dempsey Industrial Furnace Co., Springfield, Mass.
Despatch Oven Co., Minneapolis
* Electric Furnace Co., Salem, O.
Gas Machinery Co., Cleveland
Hagan Co., Geo. J., Pittsburgh
Holcroft & Co., Detroit
Mahr Mfg. Co., Minneapolis
McCann-Harrison Div., Foundry Equipt. Co., Cleveland
Philadelphia Drying Machinery Co., Philadelphia
* Rockwell Co., W. S., N. Y. C.
Salem Engineering Co., Salem, O.
Stewart Furnace Div., Chicago Flexible Shaft Corp., Chicago
Surface Combustion Corp., Toledo
Swindell-Dressler Corp., Pittsburgh
Tate-Jones & Co., Leetsdale, Pa.

FURNITURE, Shop
Aluminum Ladder Co., Tarentum, Pa.
Bradley Washfountain Co., Milwaukee
General Fireproofing Co., Youngstown, O.
* Hamilton Tool Co., Hamilton, O.
* New Britain-Gridley Machine Co., New Britain, Conn.
Ransome Concrete Machry. Co., Dunellen, N. J.
Remington Rand, Inc., Buffalo, N. Y.
* Standard Pressed Steel Co., Jenkintown, Pa.
Western Tool & Mfg. Co., Springfield, O.
Whistler & Sons, S. B., Buffalo, N. Y.

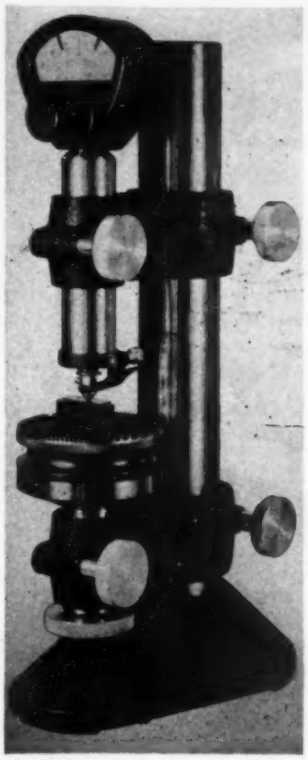
GAGES, Amplifying
* Federal Products Corp., Providence, R. I.
Pike & Co., E. W., Elizabeth, N. J.
* Pratt & Whitney Co., Hartford, Conn.
* Scherr Co., Geo., N. Y. C.
* Sheffield Corp., Gage Div., Dayton, O.
* Standard Gage Co., Inc., Poughkeepsie, N. Y.
* Swedish Gage Co. of America, Detroit
Van Keuren Co., Watertown, Mass.

GAGES, Caliper
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Federal Products Corp., Providence, R. I.
* Lufkin Rule Co., Saginaw, Mich.
* Sheffield Corp., Gage Div., Dayton, O.
* Slocomb Co., J. T., Providence, R. I.
* Starrett Co., L. S., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
* Williams Co., J. H., N. Y. C.

GAGES, Comparator
* Ames Co., B. C., Waltham, Mass.
Bausch & Lomb Optical Co., Rochester, N. Y.
Coats Machine Tool Co., N. Y. C.
* Federal Products Corp., Providence, R. I.
Index Machinery Corp., Cincinnati
* Jones & Lamson Machine Co., Springfield, Vt.
* Marburg Bros., Inc., N. Y. C.
Micro Instrument Co., Cambridge, Mass.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Scherr Co., Geo., N. Y. C.
* Sheffield Corp., Gage Div., Dayton, O.
* Standard Gage Co., Inc., Poughkeepsie, N. Y.
* Starrett Co., L. S., Athol, Mass.
* Swedish Gage Co. of America, Detroit
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.
Zeiss, Inc., Carl, N. Y. C.

GAGES, Depth
* Ames, B. C., Co., Waltham, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
Chicago Dial Indicator Co., Chicago
* Continental Machines, Inc., Minneapolis
* Federal Products Corp., Providence, R. I.
* Lufkin Rule Co., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
Pacific Tool & Supply Co., Los Angeles
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Scherr Co., Inc., Geo., N. Y. C.
* Sheffield Corp., Gage Div., Dayton, O.
* Standard Gage Co., Inc., Poughkeepsie, N. Y.
* Starrett Co., L. S., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Vineo Tool Co., Detroit
Zeiss, Inc., Carl, N. Y. C.

GAGES, Dial
* Ames Co., B. C., Waltham, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.



MIKROKATOR

"Mikro" (Minute)

Frictionless Amplification

Complete elimination of friction, lag, and backlash insures positive, dependable repeat readings. Pointer responds instantly to the slightest movement of measuring tip without swinging past the true reading. No waiting for pointer to come to rest.

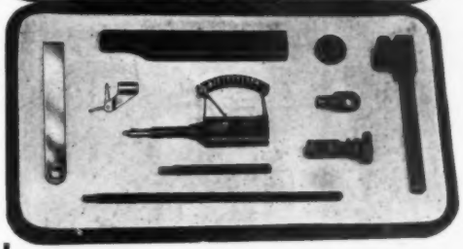
No lights or electro magnets are used, as the amplification is 100% mechanical, thus eliminating a warming up period to permit the temperature of the instrument to become stabilized.

There are no electrical connections thereby enabling the instrument and stand to be readily moved about in the shop, for use in different locations.

Graduated—.0001" to .00001"
Graduated—.001 mm to .0002 mm

SWEDISH GAGE CO. of AMERICA
7310 WOODWARD **DETROIT, MICH.**

NEW IMPROVED OSLUND UNIVERSAL INDICATOR
INDICATOR FURNISHED with CASE and ATTACHMENTS



Oslund Tool & Die Co., 14 Sigourney St., Hartford, Conn.

The only indicator with 360° reading face. Scale is easily read in any position. Accurate and quick in any set-up. Readings can be taken without mirrors when indicator is used upside-down or facing towards back of machine.
Prompt delivery
Send for Illustrated Pamphlet.

WRITE FOR DETAILS

BUZZER FURNACES
HEAT QUICKLY WITHOUT BLOWER OR POWER

ATMOSPHERIC POT FURNACES

Just connect to Gas Supply. Salts and Cyanide quickly heated to 1650° F. Economical to operate—Low cost installation.

Tangentially top fired for even heating and longer pot life. Temperatures easily controlled.

GAS FIRED FULL MUFFLE OVEN FURNACE

Ready for operation by connecting to the Gas Supply. Equipped with Diamond Block for Protective atmosphere, this furnace has been primarily designed for high carbon and alloy steels.

Quiet in operation, economical in fuel consumption, easy to control over wide range.
Rugged in construction, effectively insulated.

CHARLES A. HONES, INC., 121 S. Grand Ave., Baldwin, N. Y.

AMEs
UPRIGHT GAUGE No. 13
The model best suited for general testing and measuring in thousandths inches or less. Base is 8 inches square. Capacity for measuring to 6 inches. Weight 17 pounds.
Price $30.00
B. C. AMES CO. Waltham, Mass.

Right here is where rejections start
Put COMTORPLUG AT THE MACHINE
and catch rejects BEFORE they happen
Patented Expanding Internal Gage
Sizes: ¼" to 7" dia. and larger.
Comtorplug gives automatic accuracy in gaging bores to fractions of .0001". A favorite with government and private inspectors, it is more and more being sent out into the shop to give the operator utmost control of his machine. Comtorplug is practical for this because it is a rugged shop tool and because even a green hand can use it with split-tenth accuracy. Shows not only size, but also front or back tapers, out-of-round, bell mouth, barrel-shape, etc.
Request Bulletin 27
THE COMTOR CO.
68 RUMFORD AVE.
WALTHAM, MASS.

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GAGES, Dial (Cont.)
Chicago Dial Indicator Co., Chicago
* Comtor Co., Waltham, Mass.
* Federal Products Corp., Providence, R. I.
Index Machinery Corp., Cincinnati
Koch Test Indicator, Nyack, N. Y.
* Oslund Tool & Die Co., Hartford, Conn.
Pacific Tool & Supply Co., Los Angeles
* Randall & Stickney, Waltham, Mass.
Size Control Co., Chicago
* Standard Gage Co., Inc., Poughkeepsie, N. Y.
* Starrett Co., L. S., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Zeiss, Inc., Carl, N. Y. C.

GAGES, Drill-Center
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Lufkin Rule Co., Saginaw, Mich.
Morse Twist Drill Co., New Bedford, Mass.
* Slocomb Co., J. T., Providence, R. I.
Standard Tool Co., Cleveland
* Starrett Co., L. S., Athol, Mass.
* Union Twist Drill Co., Athol, Mass.

GAGES, Height
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Continental Machines, Inc., Minneapolis
* Lufkin Rule Co., Saginaw, Mich.
Pacific Tool & Supply Co., Los Angeles
* Scherr Co., Inc., Geo., N. Y. C.
* Starrett Co., L. S., Athol, Mass.

GAGES, Plug & Ring
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Cadillac Gage Co., Detroit
Carboloy Co., Detroit
* Comtor Co., Waltham, Mass.
* Crafts Co., Inc., Arthur A., Boston
Detroit Tap & Tool Co., Detroit
Dickerman Mfg. Co., H. E., Springfield Mass.
* Federal Products Corp., Providence, R. I.
Greenfield Tap & Die Corp., Greenfield, Mass.
* Hanson-Whitney Machine Co., Hartford, Conn.
Lincoln Park Tool & Gage Co., Lincoln Park, Mich.
Michigan Tool Co., Detroit
Morse Twist Drill & Machine Co., New Bedford, Mass.
* Offerman Tool & Die Co., L., N. Y. C.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Scherr Co., Inc., Geo., N. Y. C.
* Sheffield Corp., Gage Div., Dayton, O.
Size Control Co., Chicago
* Slocomb Co., J. T., Providence, R. I.
* Standard Gage Co., Poughkeepsie, N. Y.
* Swedish Gage Co. of America, Detroit
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.
Vinco Tool Co., Detroit
* Williams Co., J. H., N. Y. C.
Zeiss, Inc., Carl, N. Y. C.

GAGES, Pressure
Amthor Testing Instrument Co., Inc., Brooklyn, N. Y.
Ashcroft American Gauge Div., Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Baldwin-Southwark Div. Baldwin Locomotive Wks., Philadelphia
Bristol Co., Waterbury, Conn.
* Brown Instrument Co., Philadelphia
Crosby Steam Gage & Valve Co., Boston
Foxboro Co., Foxboro, Mass.
Leeds & Northrup Co., Philadelphia
Marsh, Jas. P., & Co., Chicago
Meriam Co., Cleveland
Moeller Instrument Co., Inc., N. Y. C.
Parks, Harry S., Co., Philadelphia
Uehling Instrument Co., Paterson, N. J.
United States Gauge Co., N. Y. C.

GAGES, Profile
Brush Development Co., Cleveland
Physicists Research Co., Ann Arbor, Mich.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Sheffield Corp., Gage Div., Dayton, O.
* Standard Gage Co., Inc., Poughkeepsie, N. Y.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.
Vinco Tool Co., Detroit

GAGES, Snap (See **GAGES, Plug & Ring**)

GAGES, Surface
* Ames Co., B. C., Waltham, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Lufkin Rule Co., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
* Oslund Tool & Die Co., Hartford, Conn.
* Starrett Co., L. S., Athol, Mass.

GAGES, Thickness
* Ames Co., B. C., Waltham, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
Eitzen Co., Louis C., N. Y. C.
* Federal Products Corp., Providence, R. I.
Ford Motor Co., Johansson Div., Dearborn, Mich.
* Lufkin Rule Co., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Randall & Stickney Co., Waltham, Mass.
* Scherr Co., Inc., Geo., N. Y. C.
* Sheffield Corp., Gage Div., Dayton, O.
* Standard Gage Co., Inc., Poughkeepsie, N. Y.
* Starrett Co., L. S., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.
Vinco Tool Co., Detroit
Zeiss, Inc., Carl, N. Y. C.

GAGES, Thread
Bath & Co., John, Worcester, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Cadillac Gage Co., Detroit
Detroit Tap & Tool Co., Detroit
* Federal Products Corp., Providence, R. I.
Greenfield Tap & Die Corp., Greenfield, Mass.
* Hanson-Whitney Machine Co., Hartford, Conn.
* Lufkin Rule Co., Saginaw, Mich.
Michigan Tool Co., Detroit
Millers Falls Co., Greenfield, Mass.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Scherr Co., Inc., Geo., N. Y. C.
* Sheffield Corp., Gage Div., Dayton, O.
* Slocomb Co., J. T., Providence, R. I.
* Starrett Co., L. S., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.

GAGES, Wire
Atkins & Co., E. C., Indianapolis
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
* Federal Products Corp., Providence, R. I.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Standard Tool Co., Cleveland
* Starrett Co., L. S., Athol, Mass.

GASES, Compressed
Air Reduction Sales Co., N. Y. C.
Compressed Industrial Gases, Chicago
Indiana Oxygen Co., Indianapolis
Linde Air Products Co., N. Y. C.
Matheson Co., E. Rutherford, N. J.
National Cylinder Gas Co., Chicago
Southern Oxygen Co., Arlington, Va.
Union Carbide & Carbon Corp., N. Y. C.

GASKETS (See **PACKING, Asbestos, Cotton, Felt**)

GEAR-CUTTING MACHINES
* Adams Co., Dubuque, Iowa
Apex Tool & Cutter Co., Shelton, Conn.
* Barber-Colman Co., Rockford, Ill.
Bilgram Gear & Mach. Wks., Philadelphia
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Cleveland Hobbing Machine Co., Cleveland
Colonial Broach Co., Detroit
Cross Gear & Machine Co., Detroit
* Farrel-Birmingham Co., Buffalo, N. Y.
* Fellows Gear Shaper Co., Springfield, Vt.
* General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
* Gleason Works, Rochester, N. Y.
Gould & Eberhardt, Irvington, N. J.
Illinois Tool Works, Chicago
* Lees-Bradner Co., Cleveland
Michigan Tool Co., Detroit
National Broach & Machine Co., Detroit
* National Tool Co., Cleveland
* Newark Gear Cutting Machine Co., Newark, N. J.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

* Pratt & Whitney, Div., Niles-Bement-Pond Co., Hartford, Conn.
* Producto Machine Co., Bridgeport, Conn.
* Scherr Co., Inc., Geo., N. Y. C.
* Waltham Machine Works, Waltham, Mass.

GEAR-TESTING Machines
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Farrel-Birmingham Co., Buffalo, N. Y.
* Fellows Gear Shaper Co., Springfield, Vt.
* Gleason Works, Rochester, N. Y.
Illinois Tool Works, Chicago
* Lees-Bradner Co., Cleveland
Michigan Tool Co., Detroit
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Broach & Machine Co., Detroit
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Scherr Co., Inc., Geo., N. Y. C.
Triplex Mach. Tool Corp., N. Y. C.
Van Keuren Co., Watertown, Mass.

GEARS, Cast
American Manganese Steel Div., Am. Brake Shoe & Fdry. Co., Chicago Hghts, Ill.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
* Braun Gear Corp., Brooklyn, N. Y.
Dodge Mfg. Corp., Mishawaka, Ind.
* Earle Gear & Machine Co., Philadelphia
* Farrel-Birmingham Co., Ansonia, Conn.
* General Electric Co., Schenectady, N. Y.
* Grant Gear Works Inc., Boston
Link Belt Co., Chicago
Massachusetts Gear & Tool Co., Woburn, Mass.
Mesta Machine Co., Pittsburgh
Ohio Gear Co., Cleveland
* Perkins Machine & Gear Co., Springfield, Mass.
Philadelphia Gear Works, Philadelphia

GEARS, Cut
* Adams Co., Dubuque, Iowa
Allis-Chalmers Mfg. Co., Milwaukee
Atlantic Gear Works, N. Y. C.
* Baush Machine Tool Co., Springfield, Mass.
* Bilgram Gear & Mach. Wks., Philadelphia
Bond Co., Charles, Philadelphia
Boston Gear Works, Inc., N. Quincy, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Braun Gear Corp., Brooklyn, N. Y.
Chicago Rawhide Mfg. Co., Chicago
Cincinnati Gear Co., Cincinnati
* Cincinnati Lathe & Tool Co., Oakley, Cincinnati
Crofoot Gear Corp., Chas. E., Easton, Mass.
* Earle Gear & Machine Co., Philadelphia
* Farrel-Birmingham Co., Buffalo, N. Y.
* Fellows Gear Shaper Co., Springfield, Vt.
Foote Bros. Gear & Mach. Corp., Chicago
Foote Gear Works Inc., Cicero, Ill.
* Ganschow Gear Co., Chicago
* Gear Specialties Inc., Chicago
* Gleason Works, Rochester, N. Y.
* Grant Gear Works, Inc., Boston
* Hartford Special Machinery Co., Hartford, Conn.
* James Mfg. Co., D. O., Chicago
* Johnson Machine Co., Carlyle, Manchester, Conn.
Lempco Products Co., Inc., Bedford, O.
Link Belt Co., Chicago
Massachusetts Gear & Tool Co., Woburn, Mass.
* Meisel Press Mfg. Co. Boston
Michigan Tool Co., Detroit
Morse Chain Co., Ithaca, N. Y. (Sprockets).
National-Erie Corp., Erie, Pa.
Ohio Gear Co., Cleveland
Palmer-Bee Co., Detroit
* Perkins Machine & Gear Co., Springfield, Mass.
Philadelphia Gear Works, Philadelphia
Pittsburgh Gear & Machine Co., Pittsburgh
Stahl Gear & Machine Co., Cleveland
Vinco Tool Co., Detroit

GEARS, Master
* Earle Gear & Mach. Co., Philadelphia
* Fellows Gear Shaper Co., Springfield, Vt.
Illinois Tool Works, Chicago
Michigan Tool Co., Detroit
National Broach & Mach. Co., Detroit
* National Tool Co., Cleveland
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Vinco Tool Co., Detroit

GEARS, Non-Metallic
* Adams Co., Dubuque, Iowa
Bakelite Corp., N. Y. C.
Bilgram Gear & Machine Works, Philadelphia
Boston Gear Works, Inc., N. Quincy, Mass.
* Braun Gear Corp., Brooklyn, N. Y.
Chicago Rawhide Mfg. Co., Chicago
Continental Diamond Fibre Co., Newark, Del.
Dodge Mfg. Co., Mishawaka, Ind.
* Earle Gear & Machine Co., Philadelphia
* Farrel-Birmingham Co., Buffalo, N. Y.
Foote Bros. Gear & Mach. Corp., Chicago
Foote Gear Works, Inc., Cicero, Ill.
Formica Insulation Co., Cincinnati
* Ganschow Gear Co., Chicago
* Gear Specialties, Inc., Chicago
* General Electric Co., Schenectady, N. Y.
* Grant Gear Works Inc., Boston
* Hartford Special Machinery Co., Hartford, Conn.
James Mfg. Co., D. O., Chicago
Massachusetts Gear & Tool Co., Woburn, Mass.
* Meisel Press Mfg. Co., Boston
* Perkins Machine & Gear Co., Springfield, Mass.
Philadelphia Gear Works, Philadelphia
Smith Inc., Winfield H., Springville, Erie County, N. Y.
Stahl Gear & Machine Co., Cleveland
Synthane Corp., Oaks, Pa.
Taylor Machine Co., Cleveland
* Westinghouse Elec. & Mfg. Co., Pittsburgh

GENERATORS, Carbide and Acetylene
Air Reduction Sales Co., N. Y. C.
Linde Air Products Co., N. Y. C.
National Cylinder Gas Co., Chicago

GOGGLES, Face Shields & Sweat Bands
American Allsafe Co., Buffalo, N. Y.
American Optical Co., Southbridge, Mass.
Bastian-Blessing Co., Chicago
Boyer-Campbell Co., Detroit
Chicago Eye Shield Co., Chicago
Cover, H. S., South Bend, Ind.
Davis Emergency Equipt. Co., N. Y. C.
Industrial Products Co., Philadelphia
Pulmosan Safety Equipt. Corp., Brooklyn, N. Y.
Willson Products, Inc., Reading, Pa.

GRADING MACHINES FOR GRINDING WHEELS
* Abrasive Engineering Corp., Spring Lake, Mich.

GRAINS, Abrasive
Abrasive Co., Philadelphia
American Fdry. Equip. Co., Mishawaka, Ind.
Bay State Abrasive Products Co., Westboro, Mass.
Behr-Manning Corp., Troy, N. Y.
* Carborundum Co., Niagara Falls, N. Y.
* Clover Mfg. Co., Norwalk, Conn.
Globe Steel Abrasive Co., Mansfield, O.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Norton Co., Worcester, Mass.
Pangborn Corp., Hagerstown, Md.
* Sterling Grinding Wheel Div., Tiffin, O.

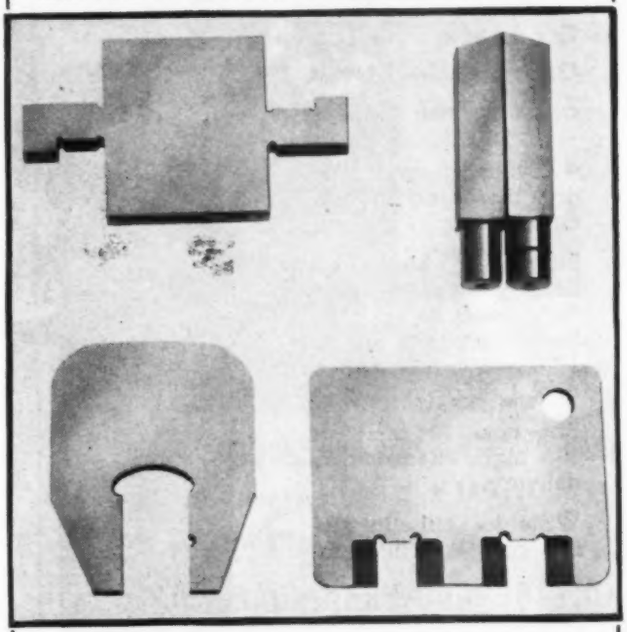
GREASE (see **OILS & GREASES, Lubricating**)

GRINDERS, Abrasive-Belt
Defiance Machine Works, Defiance, O.
Delta Mfg. Co., Milwaukee
* Hammond Machinery Bldrs., Inc., Kalamazoo, Mich.
* Mattison Machine Works, Rockford, Ill.
Oliver Mach. Co., Grand Rapids, Mich.
Porter Cable Mach. Co., Syracuse, N. Y.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Production Mach. Co., Greenfield, Mass.
* Walker-Turner Co., Inc., Plainfield, N. J.
* Walls Sales Corp., N. Y. C.

GRINDERS, Bench & Pedestal
Atlas Press Co., Kalamazoo, Mich.
Bergram Mech. Engrg. Co., New Britain, Conn.
Baldor Electric Co., St. Louis
* Black & Decker Mfg. Co., Towson, Md.
* Boyar-Schultz Corp., Chicago

GAUGES

INCREASED CAPACITY ENABLES US TO HANDLE ADDITIONAL ORDERS—*PROMPTLY*



Snap, Profile, Contour, Template, Plug, Rings, Built-Up Gauges. Tolerances maintained between 0.0001 and 0.0002 where desired.

L. OFFERMAN TOOL & DIE COMPANY
153 LAFAYETTE ST., NEW YORK, N. Y.

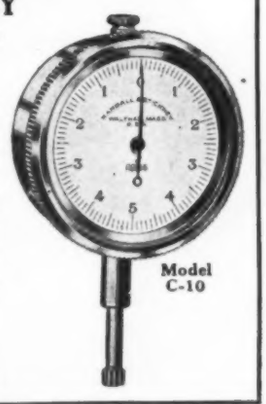
THREAD, RING and PLUG
GAGES
and THREAD CHECKING EQUIPMENT

Write for information

CADILLAC GAGE CO.
8016 Prairie DETROIT MICH.

RANDALL & STICKNEY
New 1/10,000" Indicator
Model C-10

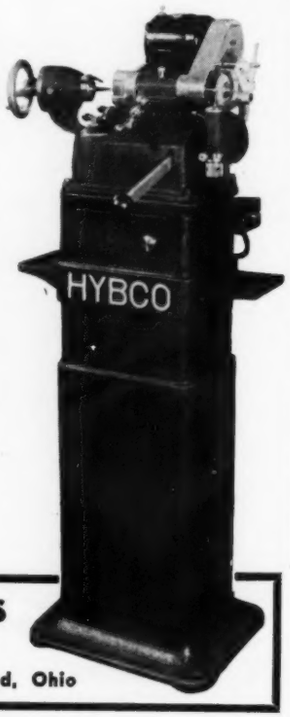
Range	.3"
Diameter of case	1 15/16"
Diameter over all	2⅛"
Depth of case	⅞"
Length over all	3⅛"
Lug or Bracket—Offset, on center if desired	Hole 3/16"
Back held in position by	4 large screws
Center of spindle to center of hole in lug	.15/16"
Weight	8 ounces
Stem	.9/32 diam.
Dial	.0-5-0 or 0-10
Graduated	.0001
Crystal	.Non-breakable



RANDALL & STICKNEY
Waltham, Mass., U. S. A.
Makers of Gauges Since 1885

KEEP TAPS LIKE NEW
. . . with
HYBCO TAP SHARPENER

Grinds . . . Chamfer — Flutes and Spiral Points



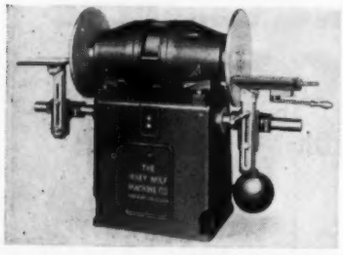
- Hybco ground taps give increased life and cut to size.

Built in two sizes—600 Series—capacity up to ⅝" hand taps. 700 Series capacity up to 1" hand taps. Bench and floor models.

Size base 13" x 16" x 52" high. Reasonable delivery.

Write for bulletin giving complete information.

HENRY P. BOGGIS & CO.
210 W. St. Clair Cleveland, Ohio



Disc Grinding is Faster!!!

Milling and shaping operations are slow compared with Disc Grinding. New developments in the manufacture of abrasive discs have eliminated the disadvantages—no longer is it necessary to cement the disc on—discs can now be used 1 and 2 inches thick which bolt on to the machine. It will pay you to browse through your milling, shaper and planer department. Many of these operations can be speeded up on a Disc Grinder. Especially is this important now in the face of priority ratings and long deliveries quoted on certain types of machine tools.

Disc Grinding also saves set up time and jig and tool costs. HISEY adjustable tables often require no more than an ordinary angle plate, or no jigs whatever for many squaring, surfacing and leveling operations.

HISEY tables are adjustable 45° in either direction and have ample area. They are made in both plain and universal lever feed types.

HISEY Disc Grinders are totally enclosed, have special thrust bearings and made in various styles from 1 to 10 H.P. capacity.

Write for Catalog No. 60J

THE HISEY-WOLF MACHINE CO.
CINCINNATI, OHIO

WHERE-TO-BUY DIRECTORY

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Forbes & Myers, Worcester, Mass.
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Hardinge Brothers, Inc., Elmira, N. Y.
* Hisey-Wolf Machine Co., Cincinnati
* Hobart Brothers, Troy, Ohio
Independent Pneu. Tool Co., Chicago
Jarvis Co., Chas. L., Middletown, Conn.
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Oliver Mach. Co., Grand Rapids, Mich.
Porter Cable Mach. Co., Syracuse, N. Y.
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Queen City Machine Tool Co., Cincinnati
Ransom Grg. Mach. Co., Oshkosh, Wis.
* Schauer Machine Co., Cincinnati
Speedway Mfg. Co., Cicero, Ill.
Standard Elec. Tool Co., Cincinnati
Stanley Elec. Tool Div., Stanley Works, New Britain, Conn.
Stark Tool Co., Waltham, Mass.
Stoody Co., Whittier, Cal.
Stow Mfg. Co., Inc., Binghamton, N. Y.
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U. S. Elec. Tool Co., Cincinnati
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Vonnegut Moulder Corp., Indianapolis
* Walker Co., O. S., Worcester, Mass.
* Walker-Turner Co., Plainfield, N. J.
* Walls Sales Corp., N. Y. C.

GRINDERS, Cam
* Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDERS, Centerless
* Cincinnati Grinders, Inc., Cincinnati
* Heald Machine Co., Worcester, Mass.
Metal Carbides Corp., Youngstown, O.
Triplex Machine Tool Co., N. Y. C.

GRINDERS, Contour
* Cleveland Tool Engrg. Co., Cleveland
Stanley Electric Tool Div., The Stanley Wks., New Britain, Conn.
* Thompson Grinder Co., Springfield, O.

GRINDERS, Cutter & Tool
* Abrasive Mach. Tool Co., E. Providence, R. I.
* Barber-Colman Co., Rockford, Ill.
* Boggis & Co., H. P., Cleveland
* Boyar-Schultz Corp., Chicago
* Brown & Sharpe Mfg. Co., Providence, R. I.
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Chittenden Corp., Cleveland
* Cincinnati Milling Machine Co., Cincinnati
* Cleveland Tool Engineering Co., Cleveland
* Continental Machines, Inc., Minneapolis
Covel Mfg. Co., Benton Harbor, Mich.
Davis Boring Tool Co., Div. Larkin-Packer Co., St. Louis
Delta Mfg. Co., Milwaukee
* Ex-Cell-O Corp., Detroit
* Fellows Gear Shaper Co., Springfield, Vt.
* Fitchburg Grinding Machine Corp., Fitchburg, Mass.
* Gallmeyer & Livingston Co., Grand Rapids, Mich.
* General Machinery Corp., Boston
* Gorton Machine Co., Geo., Racine, Wis.
* Hammond Machinery Builders, Inc., Kalamazoo, Mich.
* Heald Machine Co., Worcester, Mass.
* Hisey-Wolf Mach. Co., Cincinnati
Indian White Eagle Engrg. & Machine Wks., Brooklyn, N. Y.
* Kearney & Trecker Co., Milwaukee
* Landis Machine Co., Waynesboro, Pa.
* Landis Tool Co., Waynesboro, Pa.
* LeBlond Machine Tool Co., R. K., Cincinnati
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* National Acme Co., Cleveland
Norton Co., Worcester, Mass.
* Oliver Instrument Co., Adrian, Mich.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
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Preis Engraving Mach. Co., H. P., Newark, N. J.
Production Machine Co., Greenfield, Mass.
Rogers, Samuel C., Buffalo, N. Y.
* Scherr Co., Inc., Geo., N. Y. C.
* Sellers & Co., Wm., Philadelphia
Standard Elec Tool Co., Cincinnati
Stanley Elec. Tool Div. of Stanley Works, New Britain, Conn.
* Sundstrand Mach. Tool Co., Rockford, Ill.
T. G. M. Mfg. Co., Harrison, N. J.
* Thompson Grinder Co., Springfield, O.
* Union Twist Drill Co., Athol, Mass.
U. S. Elec. Tool Co., Cincinnati
* Walker Co., O. S., Worcester, Mass.
Willey's Carbide Tool Co., Detroit

GRINDERS, Cylindrical
* Arter Grinding Machine Co., Worcester, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
Cincinnati Elec. Tool Co. Cincinnati
* Cincinnati Grinders, Inc., Cincinnati
Dumore Co., Racine, Wis.
* Farrel-Birmingham Co., Inc., Ansonia, Conn.
* Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Garrison Machine Works, Inc., Dayton, O.
* Heald Machine Co., Worcester, Mass.
* Hisey-Wolf Machine Co., Cincinnati
* Landis Tool Co., Waynesboro, Pa.
Lempco Products, Inc., Bedford, O.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Norton Company, Worcester, Mass.
* Thompson Grinder Co., Springfield, O.

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Besly & Co., Chas. H., Chicago
Cincinnati Elec. Tool Co., Cincinnati
Cleveland Elec. Motor Co., Cleveland
Delta Mfg. Co., Milwaukee
Diamond Machine Co., Providence, R. I.
* Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Gardner Machine Co., Beloit, Wis.
* Hammond Machinery Bldrs., Inc., Kalamazoo, Mich.
Hanchett Mfg. Co., Big Rapids, Mich.
* Hisey-Wolf Machine Co., Cincinnati
Millers Falls Co., Greenfield, Mass.
Oliver Mach. Co., Grand Rapids, Mich.
Porter Cable Mach. Co., Syracuse, N. Y.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Production Machine Co., Greenfield, Mass.
Queen City Machine Tool Co., Cincinnati
Standard Elec. Tool Co., Cincinnati
U. S. Elec. Tool Co., Cincinnati
* Walls Sales Corp., N. Y. C.

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Black Diamond Saw & Mach. Co., Natick, Mass.
Blake Co., Edward, Newton Center, Mass.
Cincinnati Elec. Tool Co., Cincinnati
* Cleveland Tool Engineering Co., Cleveland
Covel Mfg. Co., Benton Harbor, Mich.
* Gallmeyer & Livingston Co., Grand Rapids, Mich.
* Hammond Machinery Bldrs., Inc., Kalamazoo, Mich.
* Hisey-Wolf Machine Co., Cincinnati
* Oliver Instrument Co., Adrian, Mich.
* Sellers & Co., Wm., Philadelphia

Simplex-M Abrasive Band Grinder

This grinder speeds production and cuts cost—abolishes expensive hand emerying or filing operations. The use of this modern machine assures straight grain finishes with sharp edges. *Write for new catalog on this and other sizes.*

WALLS SALES CORP.
96 Warren St. • New York

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* Union Twist Drill Co., Athol, Mass.
Wells Mfg. Co., Rumford, R. I.

GRINDERS, Flexible-Shaft (See **TOOLS**)

GRINDERS, Gear
* Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Gear Grinding Machine Co., Detroit
* Gleason Works, Rochester, N. Y.
* Lees-Bradner Co., Cleveland
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Triplex Machine Tool Corp., N. Y. C.

GRINDERS, Internal
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* Bryant Chucking Grinder Co., Springfield, Vt.
Crystal Lake Machine Works, Crystal Lake, Ill.
* Fitchburg Grinding Machine Corp., Fitchburg, Mass.
* Hartford Special Machinery Co., Hartford, Conn.
* Heald Machine Co., Worcester, Mass.
* Landis Tool Co., Waynesboro, Pa.
* Marburg Bros., Inc., N. Y. C.
* Rivett Lathe & Grinders, Inc., Boston
* Sundstrand Mach. Tool Co., Rockford, Ill.
Taylor & Fenn Co., Hartford, Conn.
* Thompson Grinder Co., Springfield, O.
* Van Norman Machine Tool Co., Springfield, Mass.
* Walker Co., O. S., Worcester, Mass.
Wicaco Machine Corp., Philadelphia

GRINDERS, Jig
* Moore Spec. Tool Co., Bridgeport, Conn.

GRINDERS, Knife & Shear-Blade
* Abrasive Mach. Tool Co., E. Providence, R. I.
* Arter Grinding Machine Co., Worcester, Mass.
Atkins & Co., E. C., Indianapolis
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.
Cincinnati Elec. Tool Co., Cincinnati
Defiance Machine Works, Defiance, O.
Hanchett Mfg. Co., Big Rapids, Mich.
* Hill-Acme Co., Cleveland
* Hisey-Wolf Machine Co., Cincinnati
* Mattison Machine Works, Rockford, Ill.
Rogers & Co., Samuel C., Buffalo, N. Y.
Standard Elec. Tool Co., Cincinnati, O.

GRINDERS, Portable Electric (See also **TOOLS, Portable Electric**)
* Black & Decker Mfg. Co., Towson, Md.
Chicago Pneumatic Tool Co., N. Y. C.
Chicago Wheel & Mfg. Co., Chicago
Cincinnati, Elec. Tool Co., Cincinnati
Dumore Co., Racine, Wis.
Gaston Power Tools, Chicago
* Hammond Machinery Bldrs., Inc., Kalamazoo, Mich.
* Haskins Co., R. G., Chicago
Independent Pneu. Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
M-B Products, Detroit
Madison-Kipp Corp., Madison, Wis.
Porter-Cable Mach. Co., Syracuse, N. Y.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Rotor Tool Co., Cleveland
Sawyer Elec. Mfg. Co., Los Angeles
Shuster Co., F. B., New Haven, Conn.
Speedway Mfg. Co., Cicero, Ill.
Standard Elec. Tool Co., Cincinnati
Van Dorn Elec. Tool Co., Towson, Md.

GRINDERS, Lathe-Attachment (See **ATTACHMENTS, Lathe**)

GRINDERS, Portable Pneumatic (See also **TOOLS, Portable Pneumatic**)
Chicago Pneumatic Tool Co., N. Y. C.
Independent Pneu. Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
M-B Products, Detroit
Madison-Kipp Corp., Madison, Wis.

GRINDERS, Pulley
* Abrasive Mach. Tool Co., E. Providence.

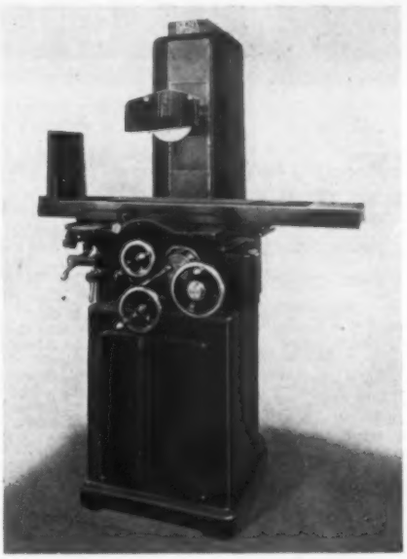
GRINDERS, Saw
Foley Mfg. Co., Minneapolis
Wardwell Mfg. Co., Cleveland

GRINDERS, Spline
* Fitchburg Grinding Machine Corp., Fitchburg, Mass.
* Marburg Bros., Inc., N. Y. C.

GRINDERS, Surface
* Abrasive Mach. Tool Co., E. Providence.
* Arter Grinding Machine Co., Worcester, Mass.
* Atlantic Machinery Co., N. Y. C.
Bergram Mech. Engrg. Co., New Britain, Conn.
Besley & Co., Chas. H., Chicago
* Blanchard Machine Co., Cambridge, Mass.
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Conn.
* Brown & Sharpe Mfg. Co., Providence.
Builders Iron Fdry., Providence, R. I.
* Continental Machines, Inc., Minneapolis
Covel Mfg. Co., Benton Harbor, Mich.
* Gallmeyer & Livingston Co., Grand Rapids, Mich.
Gardner Machine Co., Beloit, Wis.
* Hammond Machy. Builders, Inc., Kalamazoo, Mich.
Hammond Mfg. Co., Cleveland
Hanchett Mfg. Co., Big Rapids, Mich.
* Heald Machine Co., Worcester, Mass.
* Hill-Acme Co., Cleveland
* Hisey-Wolf Machine Co., Cincinnati
* Landis Tool Co., Waynesboro, Pa.
* Leach Machinery Co., H., Providence.
* Mattison Machine Works, Rockford, Ill.
* Murchey Machine & Tool Co., Detroit
Norton Co., Worcester, Mass.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Production Machine Co., Greenfield, Mass.
Robot Machinery Corp., Brooklyn, N. Y.
* Thompson Grinder Co., Springfield, O.
* Van Norman Machine Tool Co., Springfield, Mass.
* Walker Co., O. S., Worcester, Mass.
Wesson Co., Detroit
Williams, White & Co., Moline, Ill.

GRINDERS, Swing-Frame
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.
* Hammond Machinery Builders, Inc., Kalamazoo, Mich.
* Jefferson Machine Tool Co., Cincinnati
Manhattan Rubber Mfg. Div., Passaic, N. J.
Safety Grinding Wheel & Machine Co., Springfield, O.
Shuster Co., F. B., New Haven, Conn.
U. S. Electrical Tool Co., Cincinnati

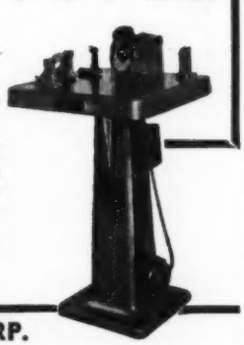
GRINDERS, Thread
* Ex-Cell-O Corp., Detroit
* Jones & Lamson Machine Co., Springfield, Vt.
* Landis Machine Co., Waynesboro, Pa.



KENT AUTOMATIC PRECISION TYPE SURFACE GRINDER
Capacity 6" x 12" x 18"
IMMEDIATE DELIVERY
ATLANTIC MACHINERY CORPORATION
140 Broadway, New York, N. Y., U. S. A.
Cable Address: ATMACOR

NEW ...FASTER!... ...MORE ACCURATE
DRY OR WET
Hammond "14"

HAMMOND CARBIDE TOOL GRINDERS
The most modern Carbide Tool Grinder available — the Hammond "14" — incorporates innumerable advantages for faster and more accurate carbide tool grinding. It is available for either wet or dry grinding and tables are mechanically controlled.
WRITE TODAY FOR BULLETIN GP-14A
● THE HAMMOND "4" ● THE HAMMOND "6"
● THE HAMMOND "10" ● THE HAMMOND "14"
Hammond Machinery Builders INC.
1618 DOUGLAS AVENUE • KALAMAZOO • MICHIGAN
EASTERN BRANCH - 21 WEST 23RD STREET, NEW YORK CITY

CUTTER LIFE EXTENDED 5 to 8 TIMES
with the
BARNES *PRECISION* CUTTER GRINDER

Highly efficient for grinding formed cutters, gangs of form or plain cutters, plain cutters, shank cutters, plain or tapered reamers; makes possible the use of profile ground formed cutters. No need to change existing cutter equipment. Form relieved cutters, sharpened on the "Barnes" become profile cutters. Quality and quantity of work produced greatly increased. Accuracy absolutely assured.
SEND FOR DESCRIPTIVE CIRCULAR
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140 Federal St. Boston, Mass.

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* Cincinnati Grinders, Inc., Cincinnati
Cosa Oversea Trading Corp., N. Y. C.
Covel Mfg. Co., Benton Harbor, Mich.
Crystal Lake Machine Works, Crystal Lake, Ill.
* Fitchburg Grinding Machine Corp., Fitchburg, Mass.
* Landis Tool Co., Waynesboro, Pa.
* LeBlond Mach. Tool Co., R. K., Cincinnati
Morse Twist Drill & Machine Co., New Bedford, Mass.
Norton Co., Worcester, Mass.
* Rivett Lathe & Grinders, Inc., Boston
* Thompson Grinder Co., Springfield, O.

GRINDING, Centerless (See **CONTRACT WORK**)

GROOVERS, Oil
Defiance Machine Works, Defiance, O.
* Hanson-Whitney Machine Co., Hartford, Conn.
* National Machine Tool Co., Cincinnati
Wicaco Machine Corp., Philadelphia

GUARDS & SAFETY APPLIANCES, Machinery
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Boyer-Campbell Co., Detroit
Buffalo Wire Works Co., Inc., Buffalo, N. Y.
Bullard, E. D., Co., San Francisco
Chicago Eye Shield Co., Chicago
Cleveland Blow Pipe & Mfg. Co., Cleveland
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Diamond Iron Works, Inc., Minneapolis
Geuder, Paeschke & Frey Co., Milwaukee
Gustafson & Scott Mfg. Co., Chicago
Johnson, E. P., Rule Mfg. Co., Chicago
Jones Superior Machine Co., Chicago
Junkin Safety Appliance Co., Louisville, Ky.
* Littleford Bros., Cincinnati
Palmer-Bee Co., Detroit
Pennsylvania Furnace & Iron Co., Warren, Pa.
Positive Safety Mfg. Co., Cleveland
Pulmosan Safety Equipment Corp., Brooklyn, N. Y.
* Ross Co., David J., Benton Harbor, Mich.
Safety Equip. Service Co., Cleveland
Schrader's A., Son, Div. of Scovill Mfg. Co., Inc., Brooklyn, N. Y.
Tally-Meter Co., Norwich, Conn.
Taylor-Shantz, Inc., Rochester, N. Y.

GUNS, Grease & Oil
Adams Grease Gun Corp., N. Y. C.
Alemite Div., Stewart-Warner Corp., Chicago
Binks Mfg. Co., Chicago
Bowen Products Corp., Detroit
De Vilbiss Co., Toledo, O.
Dover Stamping & Mfg. Co., Cambridge, Mass.
Essex Brass Corp., Detroit
Fauver Co., Inc., J. N., Detroit
Gibraltar Equip. & Mfg. Co., St. Louis
Milburn, Alexander, Co., Baltimore, Md.
Noera Mfg. Co., Waterbury, Conn.
Perkins Marine Lamp & Hardware Corp., Brooklyn, N. Y.
Rogers Products Co., Inc., Jersey City, N. J.
Rose, Frank, Mfg. Co., Hastings, Neb.
Scaife, & Sons Co., Wm. B., Oakmont, Pa.
Stevens, Walden, Inc., Worcester, Mass.
Turner Brass Works, Sycamore, Ill. (Oil only)
U. S. Air Compressor Co., Cleveland

HAMMERS, Drop
Billings & Spencer Co., Hartford, Conn.
Bliss Co., E. W., Brooklyn, N. Y.
Chambersburg Engrg. Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
* Farrel-Birmingham Co., Ansonia, Conn.
Henderson Machine Co., Philadelphia
Morgan Engrg. Co., Alliance, O.
* Niagara Machine & Tool Wks., Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington Conn.
Pneumatic Drop Hammer Co., Braintree, Mass.
Williams, White & Co., Moline, Ill.

HAMMERS, Pneumatic
Chambersburg Engrg. Co., Chambersburg, Pa.
Lobdell Car Wheel Co., Wilmington, Del.
Pneumatic Drop Hammer Co., Braintree, Mass.
Worthington Pump & Machinery Corp., Harrison, N. J.

HAMMERS, Portable Electric
* Black & Decker Mfg. Co., Towson, Md.
Chicago Pneumatic Tool Co., N. Y. C.
* Cleveland Pneu. Tool Co., Cleveland
Independent Pneu. Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
Speedway Mfg. Co., Cicero, Ill.
Stanley Electric Tool Div., Stanley Works, New Britain, Conn.
U. S. Elec. Tool Co., Cincinnati
Van Dorn Elec. Tool Co., Towson, Md.

HAMMERS, Portable Pneumatic
Chicago Pneu. Tool Co., N. Y. C.
Independent Pneu. Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
Keller, Inc., Wm. H., Grand Haven, Mich.
* Marburg Bros., Inc., N. Y. C.

HAMMERS, Power
Bradley & Sons, C. C., Syracuse, N. Y.
Chambersburg Engrg. Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
General Machinery Corp. (Niles Tool Works Div.), Hamilton, O.
Ingersoll-Rand Co., N. Y. C.
Lobdell Car Wheel Co., Wilmington, Del.
Murray Mfg. Co., D. J., Wausau, Wis.
Morgan Engrg. Co., Alliance, O.
* Sellers & Co., Wm., Philadelphia
Williams, White & Co., Moline, Ill.

HAMMERS, Softfaced
Bonney Forge & Tool Works, Allentown, Pa.
Chicago Rawhide Mfg. Co., Chicago
Goodrich Co., B. F., Akron, O.
* Greene, Tweed & Co., N. Y. C.
* Johnson Tool Co., Inc., E. Providence, R. I.
Stanley Tools, New Britain, Conn.

HAMMERS, Steam
Alliance Machine Co., Alliance, O.
Chambersburg Engrg. Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
General Machinery Corp., Hamilton, O.
Industrial Brownhoist Corp., Bay City, Mich.
Mesta Machine Co., Pittsburgh
Morgan Engrg. Co., Alliance, O.
* Sellers & Co., Wm., Philadelphia

HANDLES, Crank & Machine
Cincinnati Ball Crank Co., Oakley, Cincinnati
* Machine Products Corp., Detroit
* Williams & Co., J. H., N. Y. C.

HANDLES, File
Delta File Works, Philadelphia
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
* Nicholson File Co., Providence, R. I.
* Parker-Kalon Corp., N. Y. C.
Stanley Tools, New Britain, Conn.

HANGERS, Shaft
Ahlberg Bearing Co., Chicago
Allis-Chalmers Mfg. Co., Milwaukee
American Pulley Co., Philadelphia
Boston Gear Works, Inc., N. Quincy, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
Diamond Chain & Mfg. Co., Indianapolis
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hanson Clutch & Machinery Co., Tiffin, O.
* Hill-Acme Co., Cleveland
Link-Belt Co., Chicago
* Marlin-Rockwell Corp., Jamestown, N. Y.
Medart Co., St. Louis
Morse Chain Co., Ithaca, N. Y.
Royersford Fdry. & Mach. Co., Inc., Royersford, Pa.
Shafer Bearing Corp., Chicago
* SKF Industries, Inc., Philadelphia

HARDENING MACHINES, Electric-Induction
Ohio Crankshaft Co., Cleveland

HARDENING MACHINES, Flame
Air Reduction Sales Corp., N. Y. C.
* Farrel-Birmingham Co., Inc., Buffalo, N. Y.
Fellows Gear Shaper Co., Springfield, Vt.
* Gleason Works, Rochester, N. Y.
Linde Air Prod. Co., N. Y. C.
National Cylinder Gas Co., Chicago

HEADERS, Rivet
* Ajax Mfg. Co., Cleveland
* Grant Mfg. & Machine Co., Bridgeport, Conn.
High Speed Hammer Co., Inc., Rochester, N. Y.
* Hill-Acme Co., Cleveland
* National Machinery Co., Tiffin, O.
Rock River Machine Co., Janesville, Wis.
* Tomkins-Johnson Co., Jackson, Mich.
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

HEADS, Boring
* Acme Tool Co., N. Y. C.
Carboloy Co. Inc., Detroit
Chicago Tool & Engrg. Co., Chicago
Craley Mfg. Co., C. C., Shillington, Pa.
Davis Boring Tool Div., Larkin-Packer Co., St. Louis
Flynn Mfg. Co., Detroit
* Fray Machine Tool Co., Glendale, Calif.
* Gairing Tool Co., Detroit
* Gisholt Machine Co., Madison, Wis.
* Lovejoy Tool Co. Inc., Springfield, Vt.
* Maxwell Co., F. A., Benford, O.
Mummert-Dixon Co., Hanover, Pa.
O. K. Tool Works Co. Inc., Shelton, Conn.
Pacific Tool & Supply Co., Los Angeles
Precision Tool Co., Bridgeport, Conn.
* Rickert-Shafer Co., Erie, Pa.
* Scully Jones & Co., Chicago
Universal High Speed Tool Co., Chicago
Westcott Chuck Co., Oneida, N. Y.

HEADS, Dividing
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Cincinnati Milling Machine Co., Cincinnati
Coats Machine Tool Co., N. Y. C.
Hart Machine Co., Dorchester, Mass.
* Hartford Special Machry. Co., Hartford, Conn.
* L-W Chuck Co., Toledo, O.
Miller & Crowningshield, Greenfield, Mass.
* Taylor Mfg. Co., Milwaukee
Zeiss, Inc., Carl, N. Y. C.

HEADS, Drilling
* Baker Bros., Inc., Toledo, O.
* Barnes Drill Co., Rockford, Ill.
Bradford Machine Tool Co., Cincinnati
* Buffalo Forge Co., Buffalo, N. Y.
Buhr Mach. Tool Co., Ann Arbor, Mich.
Defiance Machine Works, Defiance, O.
* Errington Mech. Lab., Stapleton, N. Y.
* Ettco Tool Co., Brooklyn, N. Y.
* Ex-Cell-O Corp., Detroit
* Foote-Burt Co., Cleveland
Greenlee Bros. Co., Rockford, Ill.
Hoefer Mfg. Co., Freeport, Ill.
* Kingsbury Mach. Tool Co., Keene, N. H.
Langelier Mfg. Co., Cranston, R. I.
* Leland-Gifford Co., Worcester, Mass.
LeMaire Tool & Mfg. Co., Dearborn, Mich.
Linderme Machine & Tool Co., Detroit
* Moline Tool Co., Moline, Ill.
National Auto. Tool Co., Richmond, Ind.
* Sellew Machine Tool Co., Pawtucket, R. I.
* Snyder Tool & Engrg. Co., Detroit
U. S. Drill Head Co., Cincinnati

HEADS, Grinding
Bradley Machinery Co., Detroit
* Ex-Cell-O Corp., Detroit
* Fitchburg Grinding Machine Corp., Fitchburg, Mass.
* Heald Machine Co., Worcester, Mass.
* Landis Machine Co., Waynesboro, Pa.

HEADS, Milling
* Sellew Machine Tool Co., Pawtucket, R. I.
* Universal High Speed Tool Co., Cleveland

HEADS, Tapping
* Baker Bros., Inc., Toledo, O.
* Barnes Co., W. F. & John, Rockford, Ill.
* Bradford Mach. Tool Co., Cincinnati
Buhr Mach. Tool Co., Ann Arbor, Mich.
Cross Gear & Machine Co., Detroit
* Errington Mech. Lab., Stapleton, N. Y.
* Ettco Tool Co., Brooklyn, N. Y.
* Foote-Burt Co., Cleveland
Greenlee Bros. & Co., Rockford, Ill.
Hoefer Mfg. Co., Freeport, Ill.
Jarvis Co., Chas. L., Middletown, Conn.
* Kingsbury Mach. Tool Co., Keene, N. H.
* Leland-Gifford Co., Worcester, Mass.
National Auto. Tool Co., Richmond, Ind.

ERRINGTON
STAPLETON, STATEN ISLAND, N. Y.
MULTIPLE HEADS

Super-Sensitive Fixed-Center Multiple Drilling Heads
Fixed-Center Auto-Reverse Multiple Tapping Heads
All Parts Fully Enclosed to Insure Pressure Lubrication and Rigid Support of Adjustable Spindles
ADJUSTABLE MULTIPLE SPINDLE DRILLING HEAD

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** Indicates further information to be found in advertising pages.*

Procunier Safety Chuck Co., Chicago
Rockford Drilling Machine Co., Rockford, Ill.
* Sellew Machine Tool Co., Pawtucket, R. I.

HEATERS & COOLERS, Oil & Coolant
Harrison Radiator Div. General Motors Corp., Lockport, N. Y.
Schutte & Koerting Co., Philadelphia

HEATERS, Rivet
American Car & Foundry Co., N. Y. C.
* American Gas Furnace Co., Elizabeth, N. J.
* General Electric Co., Schenectady, N. Y.
Kenworthy, Inc., Chas. F., Waterbury, Conn.

HEATERS, Unit
Acme Electric Heating Co., Boston
Automatic Gas Steam Radiator Co., Pittsburgh
Despatch Oven Co., Minneapolis
Electric Air Heater Co., Div. Am. Fdry. Equipt. Co., Mishawaka, Ind.
Murray Mfg. Co., D. J., Wausau, Wis.
Sturtevant Co., B. F., Boston
Trane Co., LaCrosse, Wis.
Unit Heater & Cooler Co., Wausau, Wis.
Wing Mfg. Co., L. J., N. Y. C.
Wesley Steel Treating Co., Milwaukee
* Wiedemann Machine Co., Philadelphia
Wooler, Robert, Philadelphia

HELMETS & SHIELDS, Welding
Air Reduction Sales Co., N. Y. C.
* American Optical Co., Southbridge, Mass.
Boyer-Campbell Co., Detroit
Davis Emergency Equip. Co., N. Y. C.
Harnischfeger Corp., Milwaukee
* Hobart Bros. Co., Troy, O.
Industrial Gloves Co., Danville, Ill.
Jackson Electrode Holder Co., Detroit
* Lincoln Electric Co., Cleveland
Linde Air Products Co., N. Y. C.
Mine Safety Appliances Co., Pittsburgh
National Cylinder Gas Co., Chicago
Sellstrom Mfg. Co., Inc., Chicago
Willson Products Inc., Reading, Pa.
Wilson Welder & Metals Co., N. Y. C.

HOBBERS, Gear
* Adams Co., Dubuque, Iowa
* Barber-Colman Co., Rockford, Ill.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Cleveland Hobbing Machine Co., Cleveland
Cosa Oversea Trading Corp., N. Y. C.
Gould & Eberhardt, Irvington, N. J.
* Lees-Bradner Co., Cleveland
* Scherr Co., Geo., N. Y. C.
Triplex Mach. Tool Corp., N. Y. C.

HOBS
* Barber-Colman Co., Rockford, Ill.
Bath & Co., John, Worcester, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Hanson-Whitney Machine Co., Hartford, Conn.
* Haynes Stellite Co., N. Y. C.
Illinois Tool Works, Chicago
Michigan Tool Co., Detroit
* National Tool Co., Cleveland
* National Twist Drill & Tool Co., Detroit
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Union Twist Drill Co., Athol, Mass.

HOISTS, Chain
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.
Coffing Hoist Co., Danville, Ill.
Conco Engrg. Works, Mendota, Ill.
Ford Chain Block Div., Am. Chain & Cable Co., Philadelphia
Harrington Co., Philadelphia
Hobbs Co., Clinton E., Boston
McCollum Hoist & Mfg. Co., Downers Grove, Ill.
Morris, Inc., Herbert, Buffalo, N. Y.
* Page Steel & Wire Div. Am. Chain & Cable Co., Inc., Monessen, Pa.
Reading Chain & Block Corp., Reading, Pa.
Robbins & Myers, Inc., Springfield, O.
* Round & Son, David, Cleveland
Stephens-Adamson Mfg. Co., Aurora, Ill.
Union Mfg. Co., New Britain, Conn.
* Wright Mfg. Div. of Am. Chain Cable Co., York, Pa.
Yale & Towne Mfg. Co., Philadelphia

HOISTS, Electric
Advance Foundry Co., Dayton, O.
Allis-Chalmers Mfg. Co., Milwaukee
American Engrg. Co., Philadelphia
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.
Coeur d'Alene Hardware & Foundry Co., Wallace, Idaho
Coffing Hoist Co., Danville, Ill.
Detroit Hoist & Machine Co., Detroit
Euclid Crane & Hoist Co., Euclid, O.
Electro Lift, Inc., N. Y. C.
Harnischfeger Corp., Milwaukee
Harrington Co., Philadelphia
Industrial Brownhoist Corp., Cleveland
Jeffrey Mfg. Co., Columbus
Lewis-Shepard Sales Corp., Watertown, Mass.
Master Electric Co., Dayton, O.
McCollum Hoist & Mfg. Co., Downers Grove, Ill.
Northern Engrg. Works, Detroit
Philadelphia Gear Works, Philadelphia
Reading Chain & Block Corp., Reading, Pa.
Robbins & Myers, Springfield, O.
Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc., Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
* Wright Mfg. Div., Amer. Chain & Cable Co., York, Pa.
Yale & Towne Mfg. Co., Philadelphia

HOISTS, Pneumatic
Chicago Pneumatic Tool Co., N. Y. C.
Curtis Pneu. Machy. Co., St. Louis
Hanna Engrg. Works, Chicago
Hannifin Mfg. Co., Chicago
Independent Pneu. Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
Logansport Machine, Inc., Logansport, Ind.
Northern Engrg. Works, Detroit
Sullivan Machinery Co., Michigan City, Ind.
* Tomkins-Johnson Co., Jackson, Mich.

HOLDERS, Tool
* Acme Tool Co., N. Y. C.
Apex Machine & Tool Co., Dayton, O.
Apex Tool & Cutter Co., Shelton, Conn.
* Armstrong Bros. Tool Co., Chicago
* Auto Ordnance Corp., Bridgeport, Conn.
* Cincinnati Lathe & Tool Co., Oakley, Cincinnati
Colonial Broach Co., Detroit
Detroit Tap & Tool Co., Detroit
Elk Machine Tool Works, N. Y. C.
* Errington Mech. Lab., Stapleton, N. Y.
Flynn Mfg. Co., Detroit
Four-Grip Tool Co., Paterson, N. J.
* Gairing Tool Co., Detroit
* Gisholt Machine Co., Madison, Wis.
Michigan Tool Co., Detroit
* Morse Tool Co., Detroit
Morse Twist Drill & Machine Co., New Bedford, Mass.
O. K. Tool Co., Shelton, Conn.
R. & L. Tools, Nicetown, Philadelphia
* Ready Tool Co., Bridgeport, Conn.
* Scully-Jones & Co., Chicago
Wesson Co., Detroit
Western Tool & Mfg. Co., Springfield, O.
* Williams & Co., J. H., N. Y. C.

HONES & HONING MACHINES
* Barnes Drill Co., Rockford, Ill.
* Barnes Co., W. F., & John, Rockford, Ill.
* Carborundum Co., Niagara Falls, N. Y.
Cosa Oversea Trading Corp., N. Y. C.
Honing Equipment Corp., Detroit
* Micromatic Hone Corp., Detroit
Norton Co., Worcester, Mass.
* Sunnen Products Co., St. Louis, Mo.

HOOKS, Hoist
Kropp Forge Co., Chicago
* Williams & Co., J. H., N. Y. C.

HOSE, Flexible Metal
American Metal Hose Branch, Am. Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., N. Y. C.
Breeze Corporations, Inc., Newark, N. J.
Chicago Metal Hose Corp., Maywood, Ill.
DeVilbiss Co., Toledo, O.
Eastman Mfg. Co., Manitowoc, Wis.
Eclipse Aviation Div. of Bendix Aviation Corp., Bendix, N. J.
Goodall Rubber Co., Philadelphia
Keystone Brass & Rubber Co., Philadelphia
Mulconroy Co., Philadelphia
Packless Metal Products Corp., L. I. City, N. Y.
Penn. Flexible Metallic Tubing Co., Philadelphia
Seamlex Co., Inc., L. I. City, N. Y.
Titeflex Metal Hose Co., Newark, N. J.
Walker Brothers, Conshohocken, Pa.
Weatherhead Co., Cleveland
Whitehead Bros. Rubber Co., Trenton, N. J.

HOSE, Rubber
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Dayton Rubber Mfg. Co., Dayton, O.
Electric Hose & Rubber Co., Wilmington, Del.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Manhattan Rubber Mfg. Div., Passaic, N. J.
N. Y. Belting & Packing Co., Passaic, N. J.
U. S. Rubber Co., N. Y. C.

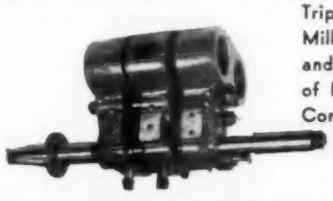
HYDRAULIC EQUIPMENT
* Denison Engineering Co., Columbus, O.
* Oilgear Co., Milwaukee
Dowty Equipment Corp., Long Island City, N. Y.
* Vickers, Inc., Detroit

INDEXING FIXTURES (see **FIXTURES, Indexing**)

INDICATORS, Dial (see **GAGES, Dial**)

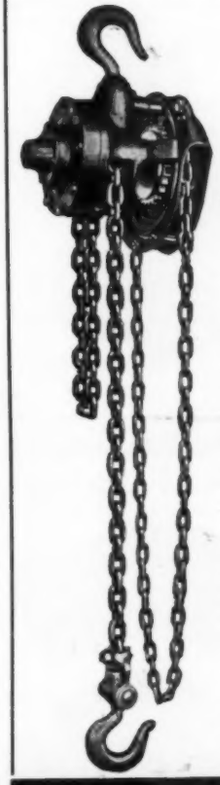
INDICATORS, Speed
Amthor Testing Inst. Co., Brooklyn, N. Y.
Bristol Co., Waterbury, Conn.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Brown Inst. Co., Philadelphia
* Scherr Co., Inc., Geo., N. Y. C.
* Starrett Co., L. S., Athol, Mass.
Veeder-Root, Inc., Hartford, Conn.
Weston Elec. Inst. Corp., Newark, N. J.
Zeiss Inc., Carl, N. Y. C.

FLYING FORTRESS gas turbo SUPERCHARGER bucket-root-roll are milled with SELLEW MULTIPLE SPINDLE HEADS, as are also the bladen root of the propulsion and auxiliary marine turbine bladen root.



Triplex Head carries three Mills, two Vertical for sides, and one horizontal for end of Rotor Concave on Stator Convex Marine Bladen Root.

SELLEW MACHINE TOOL CO.
PAWTUCKET RHODE ISLAND



Round

DR DAVID ROUND HOISTS & CRANES
Since 1869

AUTO-BLOCK
(Patented) CHAIN HOIST

Only 2 Gears . . . 1 Shaft
Less Weight . . . Less Wear

Capacity: ½ to 40 tons. The Auto-Bloc has only two gears, yet develops a mechanical efficiency of approximately 90%. *Alloy Steel Cut Gears*—stub tooth pattern, hardened and ground, provide maximum strength. *Unbreakable Cover*—drop forged chrome manganese steel. *Drop Forged Steel Hooks*—lower swivel hook is detachable. High quality *Steel Load Chain*—each link accurately formed and expertly welded for perfect fit and maximum strength.

The DAVID ROUND Line

A complete line of Chain Hoists, Trolleys, Traveling Cranes (Hand and Electric), Winches and Crabs; Welded Chains for CONVEYOR, DREDGE, HOIST, RAILROAD, SLING and every INDUSTRIAL application.

ASSOCIATE COMPANIES

CLEVELAND, OHIO, Cleveland Chain & Mfg. Co.
BRIDGEPORT, CONN., Bridgeport Chain & Mfg. Co.
SEATTLE, WASH., Seattle Chain & Mfg. Co.
SO. SAN FRANCISCO & LOS ANGELES, CALIF., Round California Chain Corp., Ltd.

DAVID ROUND & SON
CLEVELAND, OHIO

Investigate

THE POSSIBILITIES OF THE NATIONAL KEYSEATING MILLER *on Your Work*

● Shops all over the country are solving difficult keyseating problems by chucking this attachment on their drill presses, radials and horizontal boring mills—and milling keyseats in pieces too large or bulky for convenient handling on keyseating machines.

The "National" goes through the hole once and mills keyseats with parallel sides and parallel with the axis of the bore. It's a big time and money saver and is available in standard stock diameters from ½" to 3½" for cutting lengths from 1⅞" to 12". It will keyseat in blind holes, taper holes, and offset holes. We also manufacture oil-grooving millers.

Several widths of cutters can be used with each size miller and many different hole diameters keyseated with one tool through the use of eccentric bushings.

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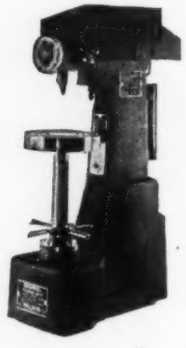
NATIONAL MACHINE TOOL CO.
CINCINNATI, OHIO

"ROCKWELL"
HARDNESS TESTER

The word "ROCKWELL" is our registered trade mark for testers that we make in many sizes. We have made them for twenty-one years.

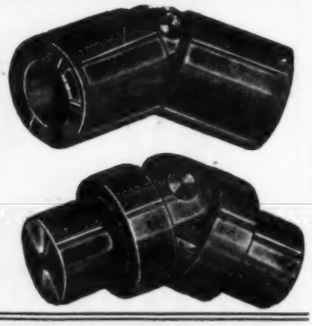
We make these in many types, so please give particulars of intended use.



WILSON
MECHANICAL INSTRUMENT CO. INC.
743 E. 143 St., N. Y.

"ATLAS" Universal Joints

Easily connected to your shafts



"ATLAS" Universal Joints are available with joint hubs bored or the ends turned to form shoulders. They can also be fitted with Key ways or fitted with square holes.

Available in a wide range of standard sizes. Maximum strength and minimum wear and friction are assured. All parts are heat-treated alloy steel.

Write for detailed specifications.

THE GRAY & PRIOR MACHINE CO., Hartford, Conn.
69 SUFFIELD STREET

INVESTIGATE

. . . Shore's Improved Portable Scleroscope Testing Set, Model C-2, Speedy, non-destructive. The World's Standard Hardness Tester since 1907, is still effective and pouplar.

Write for Circular!

THE SHORE INSTRUMENT & MANUFACTURING CO., INC.
9025 Van Wyck Ave., Jamaica, N. Y.
Jamaica 6-4090

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INDICATORS, Temperature
Bristol Co, Waterbury, Conn.
* Brown Instrument Co., Philadelphia
Foxboro Co., Foxboro, Mass.
Leeds & Northrup Co., Philadelphia
Marsh Corp., Jas. P., Chicago
Partlow Corp., New Hartford, N. Y.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Co., Rochester, N. Y.
Thwing-Albert Inst. Co., Philadelphia
Weston Elec. Inst. Corp., Newark, N. J.

INSTRUMENTS, Hardness-Measuring
Bausch & Lomb Optical Co., Rochester, N. Y.
Detroit Testing Machine Co., Detroit
Olsen Testing Mach. Co., Philadelphia
Pyro-Electric Inst. Co., Detroit
* Shore Inst. & Mfg. Co., Jamaica, N. Y.
Thwing-Albert Inst. Co., Philadelphia
* Wilson Mechanical Inst. Co., N. Y. C.

INSTRUMENTS, Optical Inspection
Bausch & Lomb Optical Co., Rochester, N. Y.
* Jones & Lamson Machine Co., Springfield, Vt.
Portman Machine Tool Co., Mt. Vernon, N. Y.

INSTRUMENTS, Testing, for Grinding Wheels
* Abrasive Engineering Corp., Spring Lake, Mich.

ISOLATORS, Vibration
Columbian Rope Co., Auburn, N. Y.

JACKS, Hand Lift
All Steel Welded Truck Corp., Rockford, Ill.
Blackhawk Mfg. Co., Milwaukee
Duff-Norton Mfg. Co., Pittsburgh
Joyce-Cridland Co., Dayton, O.
Templeton, Kenley & Co., Chicago
Yale & Towne Mfg. Co., Philadelphia

JACKS, Hydraulic
American Grinder & Specialty Corp., Fond du Lac, Wis.
Blackhawk Mfg. Co., Milwaukee
Buda Co., Harvey, Ill.
Dudgeon, Richard, Inc., N. Y. C.
General Electric Co., Schenectady, N. Y.
Hein-Werner Motor Parts Corp., Waukesha, Wis.
Henderer's, A. L., Sons, Wilmington, Del.
Joyce-Cridland Co., Dayton, O.
Logansport Machine, Inc., Logansport, Ind.
Messinger Bearings, Inc., Philadelphia
Millers Falls Co., Greenfield, Mass.
Rochester Machine Co., Rochester, Pa.
Walker Mfg. Co., Racine, Wis.
* Watson-Stillman Co., Roselle, N. J.

JACKS, Machinist's
* Armstrong Bros. Tool Co., Chicago
* Brown & Sharpe Mfg. Co., Providence, R. I.
Duff-Norton Mfg. Co., Pittsburgh
* Lufkin Rule Co., Saginaw, Mich.
* Starrett Co., L. S., Athol, Mass.
Templeton, Kenley & Co., Chicago

JIG-BORING MACHINES
* Baker Bros., Inc., Toledo, O.
* Cincinnati Bickford Tool Co., Oakley, Cincinnati
* Cleereman Mach. Tool Co., Green Bay, Wis.
* Fosdick Machine Tool Co., Cincinnati
* Giddings & Lewis Mach. Tool Co., Fond du Lac, Wis.
* Knight Machinery Co., W. B., St. Louis
* Linley Brothers Co., Bridgeport, Conn.
* Machinery Mfg. Co., Los Angeles
* Marburg Brothers Inc., N. Y. C.
* Moore Special Tool Co., Inc., Bridgeport, Conn.
* Pratt & Whitney Co., Div. Niles-Bement-Pond Co., Hartford, Conn.
* Reed-Prentice Corp., Worcester, Mass.

JIGS & FIXTURES (See also **CONTRACT WORK** pages 367-372)

JIGS, Quick-Acting
Cleveland Universal Jig Co., Cleveland
Columbus Die, Tool & Machine Co., Columbus, O.
Esco Engrg. Service Co., Toledo, O.

JOINTS, Universal
Apex Mach. & Tool Co., Dayton, O.
* Bausch Machine Tool Co., Springfield, Mass.
Borg-Warner Corp., Rockford, Ill.
Borgeson Mfg. Co., Bridgeport, Conn.
Boston Gear Works, Inc., N. Quincy, Mass.
* Gray & Prior Mach. Co., Hartford, Conn.
Hanson Clutch & Machinery Co., Tiffin, O.
Link-Belt Co., Chicago
National Auto. Tool Co., Richmond, Ind.
Philadelphia Gear Works, Philadelphia

KEYS, Machine
Moltrup Steel Prod. Co., Beaver Falls, Pa.
Morton Mfg. Co., Muskegon Heights, Mich.
Rockwood Mfg. Co., Indianapolis
Taylor Mfg. Co., Philadelphia
Whitney Chain & Mfg. Co., Hartford, Conn.

KEYSEATERS
American Broach & Machine Co., Ann Arbor, Mich.
* Baker Bros., Inc., Toledo, O.
* Consolidated Machine Tool Corp., Rochester, N. Y.
* Davis Keyseater Co., Rochester, N. Y.
General Machinery Corp., Hamilton, O.
* Gibraltar Equipment Mfg. Co., St. Louis
* Lapointe Mach. Tool Co., Hudson, Mass.
* Mitts & Merrill, Saginaw, Mich.
Morton Mfg. Co., Muskegon Heights, Mich.
* National Machine Tool Co., Cincinnati
Nixon Gear & Mach. Co., Syracuse, N. Y.
* Reed-Prentice Corp., Worcester, Mass.

KNIVES, Shear
Atkins & Co., E. C., Indianapolis
* Cincinnati Shaper Co., Cincinnati
* Cleveland Punch & Shear Works Co., Cleveland
Colonial Broach Co., Detroit
Columbia Machine Tool Co., Hamilton, O.
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
* Haynes Stellite Co., N. Y. C.
Heppenstall Co., Pittsburgh
Mesta Machine Co., Pittsburgh
Michigan Tool Co., Detroit

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

* Niagara Mach. & Tool Wks., Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Simonds Saw & Steel Co., Fitchburg, Mass.

KNURLS & KNURL HOLDERS
* American Swiss File & Tool Co., Elizabeth, N. J.
* Armstrong Bros. Tool Co., Chicago
Billings & Spencer Co., Hartford, Conn.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Graham Mfg. Co., Providenee, R. I.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Reed Small Tool Works, Worcester, Mass.
Western Tool & Mfg. Co., Springfield, O.
* Williams & Co., J. H., N. Y. C.

LACERS, Belt
Armstrong-Bray & Co., Chicago
Clipper Belt Lacer Co., Grand Rapids, Mich.
Detroit Belt Lacer Co., Detroit
Safety Belt Lacer Co., Toledo, O.

LACINGS, V-Belt
Shippert Mfg. Co., Dixon, Ill.

LAMPS, Machine & Bench
Adjustable Fixture Co., Milwaukee
Faries Mfg. Co., Decatur, Ill.
Fostoria Pressed Steel Corp., Fostoria, O.
Klemm Reflector Co., Philadelphia
McFaddin & Co., H. C., N. Y. C.
Multiple-Socket Fixture Co., Cleveland
Sampson Axcess System, Inc., Lynn, Mass.
White Co., O. C., Worcester, Mass.

LAPPERS, Centerless
* Cincinnati Grinders, Inc., Cincinnati
Production Machine Co., Greenfield, Mass.

LAPPERS, Cylindrical & Flat
* Ex-Cell-O Corp., Detroit
Foster Machine Co., Elkhart, Ind. (Superfinishing)
* Moline Tool Co., Moline, Ill.
Norton Co., Worcester, Mass. (also Superfinishing)
Schraner & Co., A. P., Cleveland
* Sellers & Co., Inc., Wm., Philadelphia

LAPPERS, Gear
* American Tool Works Co., Cincinnati
Colonial Broach Co., Detroit
* Farrel-Birmingham Co., Buffalo, N. Y.
* Fellows Gear Shaper Co., Springfield, Vt.
Gear Processing, Inc., Cleveland
* Gleason Works, Rochester, N. Y.
Lebmann Machine Co., St. Louis
* Marburg Bros., Inc., N. Y. C.
Michigan Tool Co., Detroit
National Broach & Machine Co., Detroit

LAPS, Toolmaker's
Boyer-Campbell Co., Detroit
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Lufkin Rule Co., Saginaw, Mich.
* Producto Machine Co., Bridgeport, Conn.
* Starrett, L. S., & Co., Athol, Mass.

LATHE, Pans
Kirk & Blum Mfg. Co., Cincinnati
* Littleford Bros., Cincinnati

LATHES, Automatic & Semi-Automatic
Automatic Machine Co., Bridgeport, Conn.
Baird Machine Co., Bridgeport, Conn.
Barney Machinery Co., Pittsburgh
* Bullard Co., Bridgeport, Conn.
* Cleveland Automatic Mach. Co., Cleveland
Cosa Oversea Trading Corp., N. Y. C.
Foster Machine Co., Elkhart, Ind.
* Gisholt Machine Co., Madison, Wis.
* Goss & deLeeuw Machine Co., New Britain, Conn.
* Jones & Lamson Machine Co., Springfield, Vt.
* Kingsbury Mach. Tool Corp., Keene, N. H.
* LeBlond Machine Tool Co., R. K., Cincinnati
Lipe, W. C., Syracuse, N. Y.
* Lodge & Shipley Machine Tool Co., Cincinnati
* Monarch Machine Tool Co., Sidney, O.
* National Acme Co., Cleveland
* New Britain Gridley Mach. Div., New Britain, Conn.
* Potter & Johnston Machine Co., Pawtucket, R. I.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Reed-Prentice Corp., Worcester, Mass.
* Rockford Mach. Tool Co., Rockford, Ill.
* Sebastian Lathe Co., Cincinnati
* Seneca Falls Mach. Co., Seneca Falls, N. Y.
* Sparks Machine Tool Co., Norwalk, Conn.
Sparks Simplex Machinery Corp., N. Y. C.
*Sundstrand Mach. Tool Co., Rockford, Ill.
* Warner & Swasey Co., Cleveland
Wickes Bros., Saginaw, Mich.

LATHES, Bench
* Ames Co., B. C., Waltham, Mass.
Atlas Press Co., Kalamazoo, Mich.
Bradford Machine Tool Co., Cincinnati
Brown Machine Co., Chicago
Champion Blower & Forge Co., Lancaster, Pa.
Cosa Oversea Trading Corp., N. Y. C.
* Gisholt Machine Co., Madison, Wis.
Hardinge Brothers, Inc., Elmira, N. Y.
* LeBlond Machine Tool Co., R. K., Cincinnati
Logan Engineering Co., Chicago
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Rivett Lathe & Grinders, Inc., Boston
* Schauer Machine Co., Cincinnati
* Sebastian Lathe Co. Cincinnati
* Seneca Falls Machine Co., Seneca Falls, N. Y.
* Sheldon Machine Co., Chicago
* Sidney Machine Tool Co., Sidney, O.
* South Bend Lathe Works, S. Bend, Ind.
Stark Tool Co., Waltham, Mass.
Wade Tool Co., Waltham, Mass.

LATHES, Crankshaft
* American Tool Works Co., Cincinnati
* Consolidated Machine Tool Corp., Rochester, N. Y.
Crankshaft Machine Co., Jackson, Mich.
* LeBlond Machine Tool Co., R. K., Cincinnati
* Lodge & Shipley Machine Tool Co., Cincinnati
* Potter & Johnston Machine Co., Pawtucket, R. I.
* Sundstrand Mach. Tool Co., Rockford, Ill.
* Sunnen Products Co., St. Louis
Wickes Bros., Saginaw, Mich.

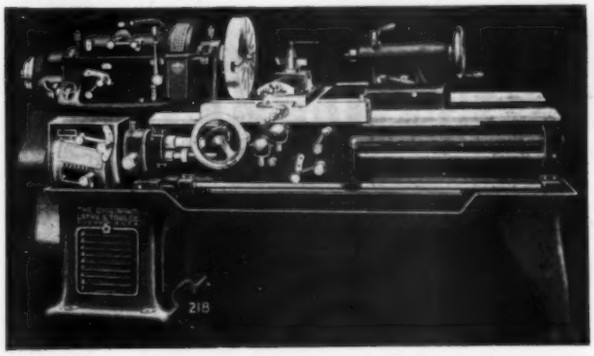
LATHES, Engine & Toolroom
* American Tool Works Co., Cincinnati
* Ames Co., B. C., Waltham, Mass.
Atlas Press Co., Kalamazoo, Mich.
* Axelson Mfg. Co., Los Angeles
Boye & Emmes Machine Tool Co., Cincinnati
Bradford Machine Tool Co., Cincinnati
* Bryant Machinery & Engrg. Co., Chicago
* Carroll & Jamieson Machine Tool Co., Cincinnati
Champion Blower & Forge Co., Lancaster, Pa.
* Cincinnati-Gilbert Machine Tool Co., Cincinnati
* Cincinnati Lathe & Tool Co., Oakley, Cincinnati
* Consolidated Machine Tool Corp., Rochester, N. Y.
General Machinery Corp. (Niles Tool Wks. Div.) Hamilton, O.

USE THIS DIRECTORY, IT WILL HELP YOU THROUGH 1942.

Cincinnati Lathes

. . . FOR FAST, ACCURATE WORK AND MAXIMUM OPERATING CONVENIENCE

"Cincinnati" Quick Change Geared Head Motor-Driven Lathes need no introduction to experienced machine shop men. Their many exclusive features enable the customer to reduce operating expenses and more than earn their cost in a short time. Our close co-operation with many leading plants has helped solve perplexing lathe problems for boring, turning or chasing any metal work most economically.

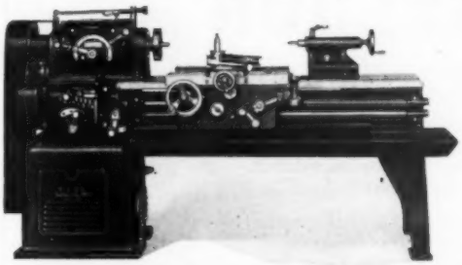


Sturdily built with every modern convenience, the Cincinnati are time and money-savers on a wide range of work. Built in 14, 16, 18, 20, 22, 24, 27 and 30-inch sizes, with 32 to 96 feed and thread changes also 12 to 24 spindle speeds. Detailed specifications available promptly. No obligation. Get your copy of latest complete catalog.

INVESTIGATE TODAY!
BACKED BY SPECIALIZED EXPERIENCE SINCE 1906

The Cincinnati Lathe & Tool Co
OAKLEY CINCINNATI, OHIO.

"C&J" 15" and 16" LATHES



12 Speed Geared—Head Motor Drive Timken mounted spindle

Modern Design Liberal Dimensions

Write for latest bulletins

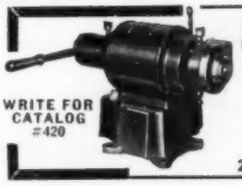
THE CARROLL & JAMIESON MACHINE TOOL CO.
BATAVIA, OHIO, U. S. A.

DAVIS KEYSEATER

This low cost machine will handle any keyseating job in the shop up to 1 ¼ in.

Write for illustrated bulletin

DAVIS KEYSEATER CO., 403 Exchange St., Rochester, N. Y.



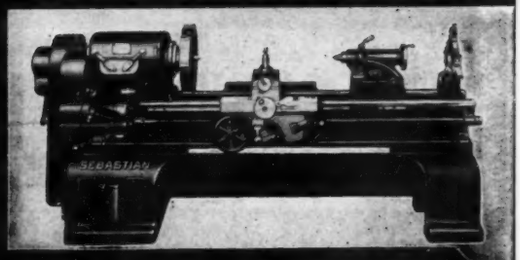
WRITE FOR CATALOG #420

SCHAUER SPEED LATHES

For Lapping—Finishing—Polishing Small Parts

SCHAUER MACHINE COMPANY
2067 Reading Road Cincinnati, O.

FOR SPEED & ACCURACY



SEBASTIAN LATHES

Accuracy of .0005" at every point of alignment is your assurance of producing work to exceptionally close tolerances.

Another point of accuracy is the use of Timken Bearings on all shafts in headstock including spindle. This construction is also responsible for a power increase of 15% to 20%. For further details get our new catalog.

The Sebastian Lathe Co.

CINCINNATI, OHIO, U.S.A.

SHELDON BACK GEARED SCREW CUTTING

Precision Lathes

Meet new production demands with new 11", and 12" Sheldon Precision Lathes. Though moderate in price, they are quality machine tools, precision tools with modern features.

The U-1226 WQ (illustrated) comes with 4-speed anti-friction lever-operated, Pedestal Motor Drive. Full Quick Change Gear Box; Large Special Analysis Steel Spindles that are ground *all-over*, inside and out—even the spindle nose thread is ground; Precision Preloaded Ball or Roller Spindle Bearings, Double Walled Worm Feed Apron with Power Cross Feed and other quality features. Sheldon lathe beds are semi-steel with hand scraped ways, 2-V ways and 2 flat ways.

Write for catalog

Sheldon Machine Co., Inc.
4234 No. Knox Ave.
Chicago, U.S.A.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

LATHES, Engine & Toolroom (Cont.)
Gerard Machine Co., Inc., Newark, N. J.
* Gisholt Machine Co., Madison, Wis.
Hardinge Brothers, Inc., Elmira, N. Y.
* Hendey Machine Co., Torrington, Conn.
* LeBlond Machine Tool Co., R. K., Cincinnati
Lehmann Machine Co., St. Louis
Lempco Products Inc., Bedford, O.
* Lodge & Shipley Machine Tool Co., Cincinnati
* Monarch Machine Tool Co., Sidney, O.
* Morris Machine Tool Co., Cincinnati
* Porter-McLeod Mach. Tool Co., Hatfield, Mass.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Reed-Prentice Co., Worcester, Mass.
* Rivett Lathe & Grinders, Inc., Boston
* Rockford Mach. Tool Co., Rockford, Ill.
* Sebastian Lathe Co., Cincinnati
* Seneca Falls Mach. Co., Seneca Falls, N. Y.
* Sheldon Machine Co., Chicago
* Sidney Machine Tool Co., Sidney, O.
* Simmons Mach. Tool Corp., Albany, N. Y.
* South Bend Lathe Works, S. Bend, Ind.
* LeBlond Machine Tool Co., R. K., Cincinnati
* Lodge & Shipley Machine Tool Co., Cincinnati

LATHES, Shell
* American Tool Works Co., Cincinnati
* Barney Machinery Co., Pittsburgh
* Bullard Co., Bridgeport, Conn.
* Cincinnati Lathe & Tool Co., Cincinnati
* Cleveland Hobbing Machine Co., Cleveland
* Coulter Machine Co., James, Bridgeport, Conn.
Federal Machine & Welder Co., Warren, O.
* Jones & Lamson Co., Springfield, Vt.
Lipe & Co., W. C., Syracuse, N. Y.
* Lodge & Shipley Co., Cincinnati
* Seneca Falls Machine Tool Co., Seneca Falls, N. Y.
* Sparks Machine Tool Corp., Norwalk, Conn.
Stamets, Wm. K., Pittsburgh
* Sundstrand Mach. Tool Co., Rockford, Ill.

LATHES, Spinning
Bliss Co., E. W., Brooklyn, N. Y.
Ferracute Mach. Co., E. Bridgeton, N. J.
Oliver Mach. Co., Grand Rapids, Mich.
Toledo Machine & Tool Co., Toledo, O.

LATHES, Turret
Acme Machine Tool Co., Cincinnati
Bardons & Oliver, Inc., Cleveland
* Bullard Co., Bridgeport, Conn.
Cosa Oversea Trading Corp., N. Y. C.
Foster Mach. Co., Elkhart, Ind.
General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
* Gisholt Machine Co., Madison, Wis.
* Goss & deLeeuw Machine Co., New Britain, Conn.
Greenlee Bros. & Co., Rockford, Ill.
Hardinge Brothers, Inc., Elmira, N. Y.
International Mach. Tool Co., Indianapolis
* Jones & Lamson Machine Co., Springfield, Vt.
* Millholland Machy Co., W. K., Indianapolis
* Monarch Machine Tool Co., Sidney, O.
* National Acme Co., Cleveland
* Potter & Johnson Machine Co., Pawtucket, R. I.
* Simmons Mach. Tool Corp., Albany, N. Y.
* Springfield Machine Tool Co., Springfield, O.
Stark Tool Co., Waltham, Mass.
* Warner & Swasey Co., Cleveland

LEVELS, Precision
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Starrett Co., L. S., Athol, Mass.
Universal Boring Mach. Co., Hudson, Mass.

LIGHTING EQUIPMENT, Industrial
Adjustable Fixture Co., Milwaukee
Benjamin Elec. Mfg. Co., Des Plaines, Ill.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Curtis Lighting, Inc., Chicago
Dazor Mfg. Corp., St. Louis
Fleurolier Mfgrs., Cleveland
General Elec. Co., Nela Park, Cleveland
General Electric Vapor Lamp Co., Hoboken, N. J.
Graybar Electric Co., Inc., N. Y. C.
Guth Co., Edwin F., St. Louis
Hanovia Chem. & Mfg. Co., Newark, N. J.
Hygrade Sylvania Corp., Salem, Mass.
Jefferson Electric Co., Bellwood, Ill.
Miller Co., Meriden, Conn.
Spanner Vapor Lamp Co., N. Y. C.
Westinghouse Electric & Mfg. Co., (Lighting Div.), Cleveland
Westinghouse Lamp Co., N. Y. C.
Zagora Mach. & Gear Co., Charlotte, N. C.

LOCK NUTS
Adapti Co., Cleveland
American Nut & Bolt Fastener Co., Pittsburgh
Anti-Corrosive Metal Products Co., Inc., Castleton-on-Hudson, N. Y.
Appleton Electric Co., Chicago
Austin Co., M. B., Chicago
Automatic Nut Corp., Inc., Lebanon, Pa.
Automotive Hardware, Inc., Indianapolis
Bayonne Bolt Corp., N. Y. C.
Bethlehem Steel Co., Bethlehem, Pa.
Blake & Johnson Co., Waterville, Conn.
Boss Bolt & Nut Co., Chicago
Cadillac Bolt & Nut Co., Cadillac, Mich.
Cayouette Products Co., Cleveland
Chicago Ferrule & Nut Co., Chicago
Chicago Steel Tank Co., Chicago
Columbia Nut & Bolt Co., Bridgeport, Conn.
Dardelet Threadlock Corp., N. Y. C.
Devlin Mfg. Co., Thos., W. Burlington, N. J.
Drake Lock-Nut Co., Cleveland
Eaton Mfg. Co., Massillon, O.
Elastic Stop Nut Corp., Elizabeth, N. J
Fafnir Bearing Co., New Britain, Conn.
Globe Metal Mfg. Co., Philadelphia
Green, Inc., R. H., Oakland, Calif.
Grinnell Co., Inc., Providence, R. I.
Grip Nut Co., Chicago
Hobbs Mfg. Co., Worcester, Mass.
Industrial Lock Nut Co., South Hanover, Mass.
Kwikon Co., Chicago
Lackner, R. J., Brooklyn, N. Y.
Lock Nut Corp. of America, Chicago
MacLean-Fogg Lock Nut Co., Chicago
Machinery Products Corp., Chicago
Malleable Iron Fittings Co., Branford, Conn.
National Elec. Prod. Corp., Pittsburgh
National Machine Products Co., Detroit
National Screw & Mfg. Co., Cleveland
Neely Nut & Bolt Co., Pittsburgh
Newbury & Son, Inc., Jay H., Goshen, N. Y.
Newbury Mfg. Co., Monroe, N. Y.
Palnut Co., Irvington, N. J.
Pheoll Mfg. Co., Chicago
Rattan Mfg. Co., New Haven, Conn.
Ravena Iron Co., Ravena, N. Y.
Rawlplug Co., Inc., N. Y. C.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Simmons Co., John, Long Island City, N. Y.
* Standard Pressed Steel Co., Jenkintown, Pa.
Steel City Electric Co., Pittsburgh
Sterling Bolt Co., Chicago
Terry Co., Andrew, Terryville, Conn.

MILLHOLLAND
TURRET LATHES • SERVICE PARTS • TOOLS
ALL SIZE MILLHOLLAND TURRET LATHES
W. K. MILLHOLLAND MACHINERY CO.
Indianapolis, Indiana, U.S.A.

WHERE-TO-BUY DIRECTORY

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Thomas & Betts Co., Elizabeth, N. J.
Tinnerman Products, Inc., Cleveland
United Screw & Bolt Corp., Cleveland
Valley Steel Products Co., St. Louis
Walworth Co., N. Y. C.
Whittet & Higgins Co., Inc., Providence, R. I.
Woodings-Verona Tool Works, Verona, Pa.

LOCKERS & SHELVING
All-Steel-Equip., Aurora, Ill.
All Steel Welded Truck Corp., Rockford, Ill.
Aurora Steel Prods. Co., Aurora, Ill.
Berger Mfg., Div. Republic Steel Corp., Canton, O.
Cincinnati Tool Co., Cincinnati
Curran Machine Works, Long Island City, N. Y.
Diagraph-Bradley Stencil Mach. Co., St. Louis
Durabilt Steel Locker Co., Aurora, Ill.
Frick-Gallagher Mfg. Co., Wallston, O.
General Fireproofing Co., Youngstown, O.
Gerstner & Sons, H., Dayton, O.
Hall Co., Gordon L., Old Lyme, Conn.
Koven & Bros. Co., Inc., L. D., Jersey City, N. J.
Lyon Metal Products Co., Aurora, Ill.
Noggle Products Co., Ann Arbor, Mich.
Palmer-Bee Co., Detroit
Ro-Tray Corp., Washington, D. C.
Security Metal Products, Inc., Kalamazoo, Mich.
Stackbin Corp., Providence, R. I.
* Union Drawn Steel Div., Republic Steel Corp., Massillon, O.

LUBRICANTS
Acheson Colloids Corp., Port Huron, Mich.
Alemite Div., Stewart-Warner Corp., Chicago
Alox Corp., Niagara Falls, N. Y.
Cities Service Co., N. Y. C.
Dixon Crucible Co., Jos., Jersey City, N. J.
Gulf Oil Corp., Pittsburgh
Houghton & Co., E. F., Philadelphia
Keystone Lubricating Co., Philadelphia
* Lubriplate Div., Fiske Brothers Refining Co., N. Y. C.
Magnus Chemical Co., Garwood, N. J.
* Oakite Products, Inc., N. Y. C.
Pure Oil Co., Chicago
* Shell Oil Corp., N. Y. C.
* Sinclair Refining Co., N. Y. C.
* Socony-Vacuum Oil Co., N. Y. C.
* Standard Oil Co. of Ind., Chicago
* Stuart Oil Co., D. A., Chicago
* Sun Oil Co., Philadelphia
Swan-Finch Oil Corp., N. Y. C.
* Texas Co., N. Y. C.
Tidewater Oil Co, N. Y. C.
U. S. Graphite Co, Saginaw, Mich.
Van Cleef Bros., Chicago

LUBRICATING SYSTEMS
Alemite Div., Stewart-Warner Corp., Chicago
American Cable Div., Am. Chain & Cable Co., Bridgeport, Conn.
* Bijur Lubricating Corp., Long Island City, N. Y.
Bowen Products Corp., Detroit
Cincinnati Ball & Crank Co., Cincinnati
* De Laval Separator Co., N. Y. C.
Essex Brass Corp., Detroit
Farval Corp., Cleveland
Gits Bros. Mfg. Co., Chicago
Keystone Lubricating Co., Philadelphia
Madison-Kipp Corp., Madison, Wis.
Pressurelube, Inc., N. Y. C.
* Rivett Lathe & Grinders, Inc., Boston
Speedway Mfg. Co., Cicero, Ill.
Trico Use Co., Milwaukee

MACHINE BASES
* Clearing Machine Corp., Chicago
* Littleford Bros., Cincinnati
Lukenweld, Inc., Coatesville, Pa.
* Van Dorn Iron Works, Cleveland
Wellman Engineering Co., Cleveland

MAGNETS, Lifting
Cutler Hammer, Inc., Milwaukee
Dings Magnetic Separator Co., Milwaukee
Electric Controller & Mfg. Co., Cleveland
* General Electric Co., Schenectady, N. Y.
* Ohio Electric Mfg. Co., Cleveland
Stearns Magnetic Mfg. Co., Milwaukee

MALLETS (see **TOOLS, Hand**)

MANDRELS, Air Operated
Hannifin Mfg. Co., Chicago
Logansport Machine, Inc., Logansport, Ind.
Nicholson & Co., W. H., Wilkes-Barre, Pa.

MANDRELS, Expanding
Anker, Holth Mfg. Co., Port Huron, Mich.
* Cleveland Twist Drill Co., Cleveland
* Cushman Chuck Co., Hartford, Conn.
Davis Boring Tool Div., Larkin Packer Co., St. Louis
* Gisholt Machine Co., Madison, Wis.
Hannifin Mfg. Co., Chicago
Lee & Son Co., K. O., Aberdeen, S. D.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
* Producto Machine Co., Bridgeport, Conn.
* Scully-Jones & Co., Chicago
* Tomkins-Johnson Co., Jackson, Mich.
Western Tool & Mfg. Co., Springfield, O.

MANDRELS, Solid
Atkins, E. C. & Co., Indianapolis
* Brown & Sharpe Mfg. Co., Providence, R. I.
Carboloy Co., Detroit
* Cleveland Twist Drill Co., Cleveland
Cochrane-Bly Co., Rochester, N. Y.
* Cushman Chuck Co., Hartford, Conn.
Davis Boring Tool Div., Larkin Packer Co., St. Louis
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
Firth-Sterling Steel Co., McKeesport, Pa.
* Gisholt Machine Co., Madison, Wis.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hannifin Mfg. Co., Chicago
Illinois Tool Works, Chicago
* Jacobs Mfg. Co., Hartford, Conn.
Lee & Son Co., K. O., Aberdeen, S. D.
Michigan Tool Co., Detroit
Morse Twist Drill & Machine Co., New Bedford, Mass.
* National Twist Drill & Tool Co., Detroit
Nicholson & Co., W. H., Wilkes-Barre, Pa.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Scully-Jones & Co., Chicago
Standard Tool Co., Cleveland
Super Tool Co., Detroit
* Union Twist Drill Co., Athol, Mass.
* Universal Engrg. Co., Frankenmuth, Mich.
Whitman & Barnes, Detroit

MARKING MACHINES
Acromark Co., Elizabeth, N. J.
Brewster & Squires, N. Y. C.
* Gorton Machine Co., Geo., Racine, Wis.
Minster Machine Co., Minster, O.
* Noble & Westbrook Mfg. Co., East Hartford, Conn.
Numberall Stamp & Tool Co., Huguenot Park, N. Y.
Preis Engraving Machine Co., H. P., Newark, N. J.

MATERIALS, Non-Metallic
Continental-Diamond Fibre Co., Newark, Del.

MASKS (See **RESPIRATORS**)

METAL-CLEANING Equipment
Alvey-Ferguson Co., 71 Disney St., Cincinnati
American Foundry Equipment Co., Mishawaka, Ind.
Barrett Co., Leon J., Worcester, Mass.
Blakeslee & Co., G. S., Cicero Sta., Chicago
* Bullard Co., Bridgeport, Conn.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Detroit Rex Products Co., Detroit
* Hobart Bros. Co., Troy, O.
Meaker Co., Chicago
Mesta Machine Co., Pittsburgh
Metalwash Machinery Co., Inc., N. Y. C.
Pangborn Corp., Hagerstown, Md.
Phillips Mfg. Co., Chicago
Ransohoff, Inc., N., Cincinnati
Spencer Turbine Co., Hartford, Conn.
Stow Mfg. Co., Inc., Binghamton, N. Y.
* Tolhurst Centrifugal Div., Amer. Mach. & Metals Inc., E. Moline, Ill.

METALS, Bearing
Amplex Div., Chrysler Corp., Detroit
* Bunting Brass & Bronze Co., Toledo, O.
Gardiner Metal Co., Chicago
Glaser Lead Co., Brooklyn, N. Y.
* Johnson Bronze Co., New Castle, Pa.
Moccasin Bushing Co., Chattanooga, Tenn.
Mueller Brass Co., Port Huron, Mich.
New Jersey Zinc Co., N. Y. C.
Oman Metals Corp., Chicago
Ryerson & Son, Jos. T., Chicago
* Westinghouse Electric & Mfg. Co., E. Pittsburgh

MICROMETERS
Bath & Co., John, Worcester, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
Cosa Oversea Trading Corp., N. Y. C.
* Davis & Thompson Co., Milwaukee
* Federal Products Corp., Providence, R. I.
Instrument Specialties Co., Little Falls, N. J.
* Lufkin Rule Co., Saginaw, Mich.
Manheim Co., Inc., K., N. Y. C.
Millers Falls Co., Greenfield, Mass.
Pacific Tool & Supply Co., Los Angeles
* Randall & Stickney, Waltham, Mass.
Reed Small Tool Works, Worcester, Mass.
* Scherr Co., Inc., George, N. Y. C.
* Slocomb Co., J. T., Providence, R. I.
* Starrett Co., L. S., Athol, Mass.
* Swedish Gage Co. of America, Detroit
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Van Keuren Co., Watertown, Mass.
Zeiss Inc., Carl, N. Y. C.

NO HOLDS BARRED!

UNSHAKO
Reg. U. S. Pat. Off.
SELF-LOCKING NUT

There's a built-in, self-energizing locking ring that's always on guard and springs to life as soon as any backing-off tendency asserts itself.

"Unshako" is easily applied, easily removed and does not retard assembly. *Saves maintenance time and breakdown trouble.* Write for details.

STANDARD PRESSED STEEL CO. BOX 4 JENKINTOWN, PENNA.

MACHINE BASES
Use fabricated machine bases—saves time—speeds up production. Send blueprints for prices today.
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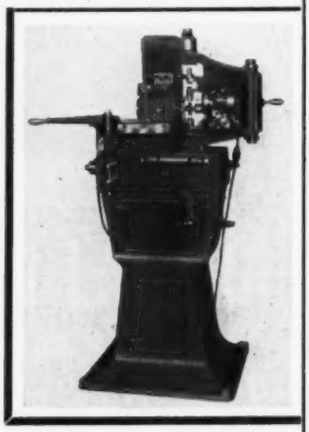
LITTLEFORD BROS., INC.
434 E. Pearl St., Cincinnati, Ohio

The NEW MILLER
PROFILE GRINDING MACHINE

Fast and accurate on a wide variety of shapes

After master has been set, parts to be reproduced can be quickly removed and replaced. It will reproduce any master locked in machine to close accuracy.

Timken Bearing equipped throughout. Drive and motor enclosed in housing 55" high. Floor space 24"x48".



Shapes shown are typical of those which can be handled and include ovals, flats, tapers, grooves and internal forming.

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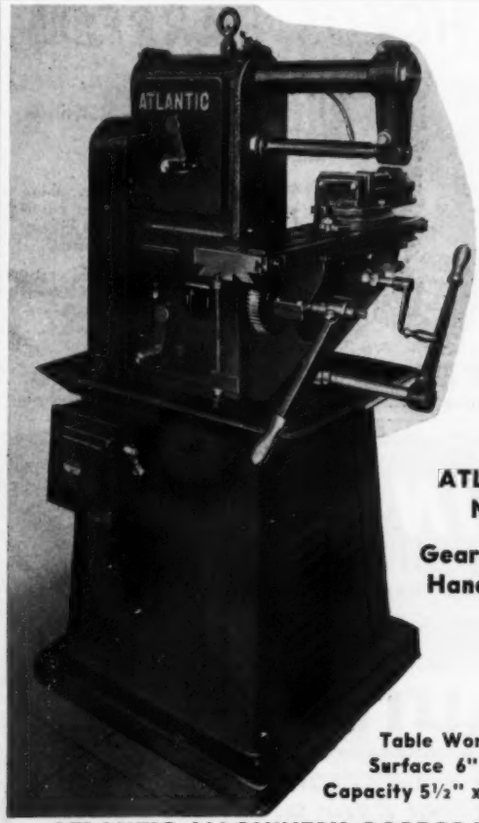
Write at Once for Full Details

MILLER ENGINEERING MACHINE CO.
31 EAST KINNEY ST., NEWARK, N. J.



ATLANTIC No. 1

Geared Head Hand Miller

Table Working Surface 6" x 24"
Capacity 5½" x 8½" x 18"

ATLANTIC MACHINERY CORPORATION
149 Broadway, New York, N. Y., U. S. A.
Cable Address: ATMACOR

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MICROSCOPES
Bausch & Lomb Optical Co., Rochester, N. Y.
Micro Instrument Co., Cambridge, Mass.
* Scherr Co., Geo., N. Y. C.
Zeiss, Inc., Carl, N. Y. C.

MILLERS, Automatic
American Machine Tool Co., Hackettstown, N. J.
Automatic Machine Co., Bridgeport, Conn.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Cincinnati Milling Machine Co., Cincinnati
* Consolidated Machine Tool Corp., Rochester, N. Y.
Cosa Oversea Trading Corp., N. Y. C.
Ingersoll Milling Mach. Co., Rockford, Ill.
* Kearney & Trecker Corp., Milwaukee
Kent-Owens Machine Co., Toledo, O.
* Producto Machine Co., Bridgeport, Conn.
* Sundstrand Mach. Tool Co., Rockford, Ill.
U. S. Tool Co., Ampere, N. J.

MILLERS, Bench
* Ames Co., B. C., Waltham, Mass.
Burke Machine Tool Co., Conneaut, O.
Hardinge Brothers, Inc., Elmira, N. Y.
* Lewis Machine Tool Co., Los Angeles
* Linley Bros. Co., Bridgeport, Conn.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Producto Machine Co., Bridgeport, Conn.
Stark Tool Co., Waltham, Mass.
* Sundstrand Mach. Tool Co., Rockford, Ill.

MILLERS, Duplex
* Cincinnati Milling Machine Co., Cincinnati
Cochrane-Bly Co., Rochester, N. Y.
* Consolidated Machine Tool Corp., Rochester, N. Y.
* Davis & Thompson Co., Milwaukee
Defiance Machine Works, Defiance, O.
Fitchburg Engrg. Corp., Fitchburg, Mass.
General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
Ingersoll Milling Mach. Co., Rockford, Ill.
* Kearney & Trecker Corp., Milwaukee
* Producto Machine Co., Bridgeport, Conn.
* Sundstrand Mach. Tool Co., Rockford, Ill.
* Snyder Tool & Engrg Co., Detroit
Taylor & Fenn Co., Hartford, Conn.

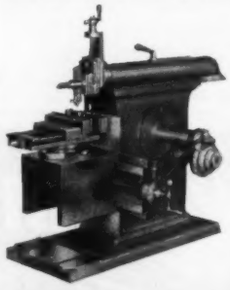
MILLERS, Hand
* Atlantic Machinery Co., N. Y. C.
Automatic Machine Co., Bridgeport, Conn.
* Brown & Sharpe Mfg. Co., Providence, R. I.
Frew Machine Co., Philadelphia.
Hardinge Brothers, Inc., Elmira, N. Y.
Kent-Owens Machine Co., Toledo, O.
Lucas & Sons, Inc., J. L., Bridgeport, Conn.
Miller & Crowningshield, Greenfield, Mass.
* Nichols & Sons, W. H., Waltham, Mass.
* Producto Machine Co., Bridgeport, Conn.
Stark Tool Co., Waltham, Mass.
* Sundstrand Mach. Tool Co., Rockford, Ill.
* Van Norman Machine Tool Co., Springfield, Mass.

MILLERS, Plain & Universal
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Cincinnati Milling Machine Co., Cincinnati.
Cochrane-Bly Co., Rochester, N. Y.
* Douglas Machinery Co., Inc., N. Y. C.
* Fray Mach. Tool Co., Glendale, Calif.
Gorton Machine Co., Geo., Racine, Wis.
Hardinge Brothers, Inc., Elmira, N. Y.
Ingersoll Milling Mach. Co., Rockford, Ill.
* Kearney & Trecker Corp., Milwaukee
* Kempsmith Machine Co., Milwaukee
Kent-Owens Machine Co., Toledo, O.
* Lucas & Son, Inc., J. L., Bridgeport, Conn.
* Knight Machinery Co., W. B., St. Louis
* Nichols & Sons, W. H., Waltham, Mass.
* Pope Machinery Corp., Haverhill, Mass.
Preis Engraving Mach. Co., Newark, N.J.
* Producto Machine Co., Bridgeport, Conn.
* Sidney Machine Tool Co., Sidney, O.
* Sundstrand Mach. Tool Co., Rockford, Ill.
* Van Norman Machine Tool Co., Springfield, Mass.

MILLERS, Planer Type
* Cincinnati Planer Co., Oakley, Cincinnati
* Consolidated Machine Tool Corp., Rochester, N. Y.
Fitchburg Engrg. Corp., Fitchburg, Mass.
General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
* Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.
* Gray Co., G. A., Cincinnati
Ingersoll Milling Mach. Co., Rockford, Ill.
* Kearney & Trecker Corp., Milwaukee
* Sellers & Co., Inc., Wm., Philadelphia
Stokerunit Corp., Milwaukee

MILLERS, Planetary
Hall Planetary Co., Philadelphia

Lewis Semi-Finished Machine Tools
Prompt Delivery! Sensible Prices!



All major machining operations finished to high degree of accuracy. Perfectly designed, shop-tested, trouble-proof construction. Exceptionally efficient. Stand severest service.
LEWIS 10" SHAPER—has 10" stroke, 10" longitudinal feed and 7" vertical feed.

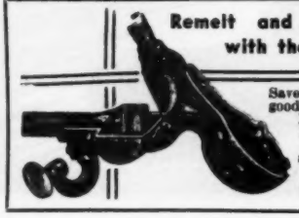
LEWIS BENCH MILL—handles full range milling work. Table 3⅞" x 18", travel 12", cross feed 5½", vertical 7".

Complete—including semi-finished castings, all necessary materials and blueprints.

Send today for new Catalog of Lewis Products with complete specifications.

LEWIS MACHINE TOOL COMPANY
P.O. Box 116, Sta. A, Dept. R-14, Los Angeles

Remelt and Cast Your Lead Hammers with the Field Mould and Ladle



Save time and money—keep lead hammers in good condition at all times—easy to use—fast. Made in 7 sizes for hammers from 1 to 11 lbs. Write for details.
Also, Lead Hammers, sizes 1 to 15 lbs. always in stock.

JOHNSON TOOL CO., INC.
East Providence Rhode Island, U.S.A.

WHERE-TO-BUY DIRECTORY

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MILLERS, Profile
Automatic Machine Co., Bridgeport, Conn.
* Consolidated Machine Tool Corp., Rochester, N. Y. (Newton Div.)
Cosa Oversea Trading Corp., N. Y. C.
Frew Machine Co., Philadelphia
* Gorton Machine Co., Geo., Racine, Wis.
* Knight Machinery Co., W. B., St. Louis
* Miller Engineering & Machine Co., Newark, N. J.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Preis Engraving Mach. Co., Newark, N.J.
* Producto Machine Co., Bridgeport, Conn.
* Reed-Prentice Corp., Worcester, Mass.
Wade Tool Co., Waltham, Mass.

MILLERS, Thread
* Adams Co., Dubuque, Iowa
Automatic Machine Co., Bridgeport, Conn.
* Coulter Mach. Co., James, Bridgeport, Conn.
* Gordon R. Co., Royaloak, Mich.
Hall Planetary Co., Philadelphia
* Hanson-Whitney Machine Co., Hartford, Conn.
* Lees-Bradner Co., Cleveland
* Marburg Brothers, Inc., N. Y. C.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Producto Machine Co., Bridgeport, Conn.
* Rivett Lathe & Grinders, Inc., Boston
* Scherr Co., Inc., Geo., N. Y. C.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
* Waltham Machine Works, Waltham, Mass.

MILLERS, Vertical
* Blank & Buxton Machry. Co., Jackson, Mich.
* Brown & Sharpe Mfg. Co., Providence, R. I.
Bridgeport Pattern & Model Works, Bridgeport, Conn.
* Cincinnati Milling Machine Co., Cincinnati
Cochrane-Bly Co., Rochester, N. Y.
* Consolidated Machine Tool Corp., Rochester, N. Y. (Newton Div.)
Ekstrom Carlson Co., Rockford, Ill.
General Machinery Corp. (Niles Tool Works Div.), Hamilton, O.
* Gorton Machine Co., Geo., Racine, Wis.
Hardinge Bros., Inc., Elmira, N. Y.
Ingersoll Milling Mach. Co., Rockford, Ill.
* Kearney & Trecker Corp., Milwaukee
* Kempsmith Mfg. Co., Milwaukee
* Knight Machinery Co., W. B., St. Louis
* Linley Bros. Co., Bridgeport, Conn.
* Machinery Mfg. Co., Los Angeles
* Miller Engineering & Machine Co., Newark, N. J.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Producto Machine Co., Bridgeport, Conn.
* Reed-Prentice Corp., Worcester, Mass.
* Sidney Machine Tool Co., Sidney, O.
* Sommer & Adams Co., Cleveland
Stark Tool Co., Waltham, Mass.
* Sundstrand Mach. Tool Co., Rockford, Ill.
Taylor & Fenn Co., Hartford, Conn.
* Van Norman Machine Tool Co., Springfield, Mass.

MOLDING MACHINES, Plastic
* Adams Co., Dubuque, Iowa
Grotelite Co., Bellevue, Ky.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Kux Machine Co., Chicago
Osborn Mfg. Co., Cleveland
Phoenix Machine Co., Cleveland
* Reed-Prentice Corp., Worcester, Mass.
Standard Machinery Co., Mystic, Conn.
Stokes Mach. Co., F. J., Philadelphia
* Watson-Stillman Co., Roselle, N. J.

MOLDS, Lead Hammer
American Chasing & Modeling Co., N. Y. C.
Battery Equip. & Supply Co., Chicago
Baum's Metal Specialties, Kansas City, Mo.
Doty Co., Melvin F., Detroit
Fanning Co., J. P., Brooklyn, N. Y.
Geuder, Paeschke & Frey Co., Milwaukee
Horat, J., Lafayette, Ind.
Johnson Inc., Wm., Newark, N. J.
* Johnson Tool Co., Inc., E. Providence

Only One Work Setup—
for All Operations with

FRAY
RAM TYPE-7B
UNIVERSAL
MILLING MACHINES

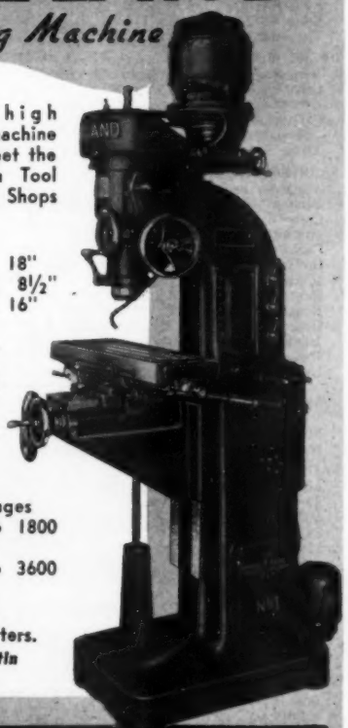
The cross movement of the Head above the work—as well as the longitudinal movement—is definitely controlled—giving a range of operations with one work set-up that is *not possible* with any other milling machine.

The Ram has 10" in-and-out movement—is mounted in a saddle with 10" transverse movement on turret head, which can be rotated 360°. The "ALL-ANGLE" milling head can be rotated 360° in horizontal or vertical planes, so that Head can be set instantly to any angle or compound angle.

Designed by Toolmakers for Toolmakers' Use

FRAY MACHINE TOOL CO.
517 W. Windsor Road Glendale, Calif.

CLEVELAND
Vertical Milling Machine



Here is a small, rigid, high speed vertical milling machine designed and built to meet the needs of the modern Tool Rooms, Die and Mold Shops and Production Plants.

Capacity
Longitudinal Feed ..... 18"
Cross Travel ..... 8½"
Vertical Travel ..... 16"

Table
Working Surface—8"x32"
T-Slots—three 17/32", center to center 1⅞"

Table Feeds
Twelve ranging from .6" to 12½" per min.
Motor ⅓ H.P.
Spindle Speeds—Two Ranges
12 speeds 100 r.p.m. to 1800 r.p.m.
12 speeds 200 r.p.m. to 3600 r.p.m.

Cutter Capacity
1/16" to 2½" milling cutters.

Full descriptive bulletin upon request.

The SOMMER & ADAMS Company
CLEVELAND . . . OHIO, U.S.A.

No. 2 American PLAIN MILLING MACHINE

Offering:
Motor-in-Base Drive
Infinite Spindle Speeds
Standardized Spindle Nose
Heavy Rugged Construction
Centralized Controls

Infinite spindle speeds from 25 to 500 R.P.M. obtained instantly while machine is in operation. Power longitudional and power transverse feeds, 16 geared feeds, push button and lever controlled.

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All controls centrally located for easy efficient operation with minimum effort.

Send at once for full information and complete specifications.

Prompt Deliveries

J. L. LUCAS & SON, INC. BRIDGEPORT, CONN., U.S.A.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

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Manhattan Modeling & Chasing Co., N. Y. C.
Margach Mfg. Co., N. Y. C.
Metal Cast Products Co., N. Y. C.
Modern Iron Works, Quincy, Ill.
N. B. C. Engraving Co., Inc., N. Y. C.
Pioneer Mold Co., Cleveland
Rapaport Bros., Chicago
Schwerdtle Stamp Co., Bridgeport, Conn.
Schweizer Co., Chas. K., St. Louis
Snell, Inc., Wm., Newark, N. J.
Stevenson, Inc., Ashton G., Chicago
Tietzman Engr. Co., Dayton, O.
Vulcan Mold & Iron Co., Latrobe, Pa.
Whistler & Sons, Inc., S. B., Buffalo, N. Y.

MOTORS, Electric
Allis Co., Louis, Milwaukee
Allis-Chalmers Mfg. Co., Milwaukee
* Barber-Colman Co., Rockford, Ill.
* Bodine Electric Co., Chicago
Century Electric Co., St. Louis
Cleveland Elec. Motor Co., Cleveland
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Delco Products Div. of General Motors Corp., Dayton, O.
Diehl Mfg. Co., Elizabethport, N. J.
Dumore Co., Racine, Wis.
Emerson Electric Mfg. Co., St. Louis
Fairbanks Morse & Co., Chicago
* General Electric Co., Schenectady, N. Y.
Graybar Electric Co., Inc., N. Y. C.
Harnischfeger Corp., Milwaukee
Howell Elec. Motors Co., Howell, Mich.
* Lincoln Electric Co., Cleveland
* Ohio Electric Mfg. Co., Cleveland
Peerless Electric Co., Racine, Wis.
Quality Hardware & Mach. Corp., Chicago
* Reliance Elec. & Engrg. Co., Cleveland
Sterling Elec. Motors, Inc., Los Angeles
U. S. Elec. Motors Inc., Los Angeles
Wagner Electric Corp., St. Louis
* Wesche Electric Co., B. A., Cincinnati
* Westinghouse Elec. & Mfg. Co., E. Pittsburgh

MOTORS, Geared (See **MOTORS, Electric**)

MOTORS, Hydraulic (See also **Pumps, Hydraulic**)
Hydro-Power Systems, Inc., Pittsburgh
* Oilgear Co., Milwaukee
* Racine Tool & Machine Co., Racine, Wis.
* Sundstrand Mach. Tool Co., Rockford, Ill.
* Vickers, Inc., Detroit

NAMEPLATES
Acromark Co., Elizabeth, N. J.
Amer. Emblem Co., Inc., Utica, N. Y.
Dickey-Grabler Co., Cleveland
Grammes & Sons, L. F., Allentown, Pa.
Imperial Brass Mfg. Co., Chicago
Matthews & Co., Jos. H., Pittsburgh
* Noble & Westbrook Mfg. Co., Hartford, Conn.

NIBBLERS
Campbell Div., Andrew C. (Amer. Chain & Cable Co.), Bridgeport, Conn.
Gray Mach. Co., Philadelphia
Mitts & Merrill, Saginaw, Mich.
Quickwork-Whiting Corp., Harvey, Ill.
Savage Co., W. J., Knoxville, Tenn.
St. Louis Tool Co., St. Louis

NOZZLES, Blast-Cleaning
American Fdry. Equipment Co., Mishawaka, Ind.
Binks Mfg. Co., Chicago
DeVilbiss Co., Toledo, O.
Norton Company, Worcester, Mass.
Pangborn Corp., Hagerstown, Md.
Stoody Co., Whittier, Calif.

NOZZLES, Spray
Ace Value Co., N. Y. C.
Binks Mfg. Co., Chicago
Deister Concentrator Co., Ft. Wayne, Ind.
DeVilbiss Co., Toledo, O.
Eclipse Air Brush Co., Newark, N. J.
Link-Belt Co., Chicago
Morley Co., Kansas City, Mo.
Saylor Beall Mfg. Co., Detroit
Spray Engrg. Co., Somerville, Mass.

NUMBERING MACHINES (See **MARKING MACHINES**)

NUT-BLANKING MACHINES
* Cleveland Automatic Machine Co., Cleveland
* National Acme Co., Cleveland
National Machinery Co., Tiffin, O.
* Potter & Johnston Machine Co., Pawtucket, R. I.
Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.

NUTS, Self-Locking
Elastic Stop Nut Corp., Union, N. J.
Industrial Lock Nut Co., South Hanover, Mass.
Palnut Co., The, Irvington, N. J.

OILERS, Automatic (See **LUBRICATING SYSTEMS**)

OILS, Cutting
Alox Corp., Niagara Falls, N. Y.
Cities Service Co., N. Y. C.
Fiske Brothers Refining Co., N. Y. C.
Gulf Oil Corp., Pittsburgh
Houghton & Co., E. F., Philadelphia
Keystone Lubricating Co., Philadelphia
* Racine Tool & Machine Co., Racine, Wis.
Ridge Tool Co., Elyria, O.
Shell Oil Co., Inc., N. Y. C.
Sinclair Refining Co., N. Y. C.
* Socony-Vacuum Oil Co., N. Y. C.
* Standard Oil Co. (Ind.), Chicago
* Stuart Oil Co., D. A., Chicago
Sulfo Corp. of America, Elizabeth, N. J.
* Sun Oil Co., Philadelphia
Swan-Finch Oil Corp., N. Y. C.
* Texas Co., N. Y. C.
Tidewater Associated Oil Co., N. Y. C.

OILS & GREASES (See **LUBRICANTS**)

OILS, Quenching & Tempering
Cities Service Co., N. Y. C.
Gulf Oil Corp., Pittsburgh
Houghton & Co., E. F., Philadelphia
* Shell Oil Co., Inc., N. Y. C.
* Sinclair Refining Co., N. Y. C.
* Socony-Vacuum Oil Co., N. Y. C.
* Standard Oil Co. (Ind.), Chicago
* Stuart Oil Co., D. A., Chicago
* Sun Oil Co., Philadelphia
Swan-Finch Oil Corp., N. Y. C.
* Texas Co., N. Y. C.
Tidewater Oil Co., N. Y. C.

OVENS, Gas-Fired
Despatch Oven Co., Minneapolis, Minn.
Gehnrich Corp., L. I. City, N. Y.
Lancaster Iron Works, Lancaster, Pa.
Philadelphia Drying Machry. Co., Philadelphia
Young Bros. Co., Detroit

PACKING, Hydraulic
Alexander Bros., Philadelphia
Belmont Packing & Rubber Co., Phila.
Crane Packing Co., Chicago
Garlock Packing Co., Palmyra, N. Y.
Goodrich Co., B. F., Akron, O.
Graton & Knight Co., Worcester, Mass.
* Greene, Tweed & Co., N. Y. C.
Hewitt Rubber Corp., Buffalo, N. Y.
Houghton & Co., E. F., Philadelphia
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Jenkins Bros., N. Y. C.
Johns-Manville, N. Y. C.
Logansport Machine, Inc., Logansport, Ind.
Raybestos-Manhattan, Inc., Passaic, N. J.
Rhoads & Sons, J. E., Philadelphia
* Watson-Stillman Co., Roselle, N. J.

PAINTS, Varnishes, etc.
Aluminum Industries, Inc., Cincinnati
American Coppercote, Inc., N. Y. C.
Ault & Wiborg Corp., Cincinnati
Bakelite Corp., N. Y. C.
Dixon Crucible Co., Jos., Jersey City, N. J.
du Pont de Nemours & Co., E. I., Wilmington, Del.
General Plastics, Inc., N. Tonawanda, N. Y.
Goodrich Co., B. F., Akron, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Hilo Varnish Corp., Brooklyn, N. Y.
Maas & Walstein, Newark, N. J.
Quigley Co., Inc., N. Y. C.
National Lead Co., N. Y. C.
New Jersey Zinc Co., N. Y. C.
Roxalin Flex. Lacquer Co., Elizabeth, N. J.
Sherwin-Williams Co., Cleveland
Skybryte Co., Cleveland
U. S. Gutta Percha Paint Co., Providence, R. I.
Vita-Var Corp., Newark, N. J.
Wet-X-Hale Paint Compound Co., N. Y. C.

PAPER & CLOTH, Abrasive
Abrasive Products, Inc., S. Braintree, Mass.
Armour Sandpaper Works, Chicago
Behr-Manning Corp., Troy, N. Y.
* Carborundum Co., Niagara Falls, N. Y.
* Clover Mfg. Co., Norwalk, Conn.
* Midwest Abrasive Co., Detroit
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Norton Co., Worcester, Mass.

PARALLELS
* Brown & Sharpe Mfg. Co., Providence, R. I.
Busch Co., J. C., Milwaukee
Ford Motor Co., Johansson Div., Dearborn, Mich.
* Starrett Co., L. S., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
* Walker Co., O. S., Worcester, Mass.

PARTS Precision (See also **CONTRACT WORK, pages 367-372**)
* Waltham Watch Co., Waltham, Mass.

PICKLING MACHINES (See **METAL-CLEANING EQUIPMENT**)

PINS, Dowel & Taper
* Allen Mfg. Co., Hartford, Conn.
American Steel & Wire Co., Cleveland
Bard Mfg. Co., Royersford, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
* Danly Machine Specialties, Inc., Chicago
Die Supply Co., Cleveland
Groov-Pin Corp., Union City, N. J.
Heim Co., Fairfield, Conn.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Pittsburgh Steel Co., Pittsburgh
Townsend Co., New Brighton, Pa.
U. S. Tool Co., Inc., Ampere, N. J.

PIPE CUTTING & THREADING MACHINES
* Armstrong Bros. Tool Co., Chicago
Bardons & Oliver, Inc., Cleveland
Beaver Pipe Tools Inc., Warren, O.
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.
* Cleveland Automatic Machine Co., Cleveland
Cochrane-Bly Co., Rochester, N. Y.
* Hill-Acme Co., Cleveland
* Landis Mach. Co., Inc., Waynesboro, Pa.
* Murchey Machine & Tool Co., Detroit
Oster Mfg. Co., Cleveland
Peerless Machine Co., Racine, Wis.
Pipe Machinery Co., Cleveland
* Rickert-Shafer Co., Erie, Pa.
Ridge Tool Co., Elyria, Ohio
* Scherr Co., Inc., Geo., N. Y. C.
Stamets, Wm. K., Pittsburgh
Toledo Pipe Threading Machine Co., Toledo, O.
Whitney Chain & Mfg. Co., Hartford, Conn.

PLANERS
Automatic Machine Co., Bridgeport, Conn.
* Cincinnati Planer Co., Oakley, Cincinnati
* The Cleveland Planer, Cleveland
* Cleveland Punch & Shear Works, Inc., Cleveland
* Consolidated Machine Tool Corp., Rochester, N. Y.
* General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
* Gray Co., G. A., Cincinnati
* Liberty Planers, Inc., Hamilton, O.
Mesta Machine Co., Pittsburgh
* Ohio Machine Tool Co., Kenton, O.
* Rockford Mach. Tool Co., Rockford, Ill.
* Sellers & Co., Inc., Wm., Philadelphia

PLANERS, Plate
Baldwin-Southwark Corp., Philadelphia
* Cleveland Punch & Shear Works Co., Cleveland
* Consolidated Machine Tool Corp., Rochester, N. Y.
General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
Morton Mfg. Co., Muskegon Hts., Mich.
* Ohio Machine Tool Co., Kenton, O.
* Sellers & Co., Wm., Philadelphia

PLASTIC Molding Materials
* Bakelite Corp., N. Y. C.
Celluloid Corp., N. Y. C.
Dow Chemical Co., Midland, Mich.
du Pont de Nemours & Co., E. I., Wilmington, Del.

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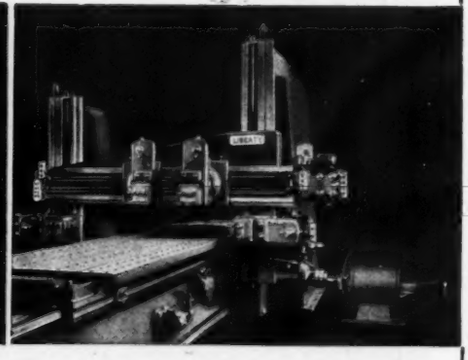
All Types—for Heavy Duty Service

DOUBLE HOUSING
•
OPEN SIDE
•
CONVERTIBLE
•
DIE BLOCK



Engineered for longer life and greater accuracy the new design LIBERTY PLANERS provide rail heads offset toward center and side heads offset toward top. All heads and tool slides have rapid traverse and power feed in all directions. Dual push button control, automatic clamping of cross rail and friction type electric feeds are provided.

Other features include: forced feed lubrication to vees and bearings, all gears operating in a bath of oil, hold down gibs running full length of table and forged steel racks dowelled and bolted to table.

Send for Catalog 152 and 153.

LIBERTY PLANERS Inc. HAMILTON, OHIO

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

Durite Plastics, Inc., Philadelphia
Fiberloid Div. of Monsanto Chemical Co., Indian Orchard, Mass.
General Electric Co., Bridgeport, Conn.
Masury & Son, John W., Brooklyn, N. Y.
Makalot Corp., Boston
Nixon Nitration Works, E. Nixon, N. J.
Reilly Tar & Chem. Corp., Indianapolis
Richardson Co., Chicago
Tennessee Eastman Corp., Kingsport, Tenn.

PLATES, Angle
* Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland Universal Jig Co., Cleveland
* Fletcher, B. F., Boston
Knu-Vise Products Co. Inc., Detroit
* Lombard Governor Corp., Ashland, Mass.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Starrett Co., L. S. Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
U. S. Automatic Box Machinery Co., Roslindale, Mass.
Van Keuren Co., Watertown Mass.

PLATES, Surface
* Acme Tool Co., N. Y. C.
* Baumbach Mfg. Co., E. A., Chicago
* Brown & Sharpe Mfg. Co., Providence, R. I.
Busch Co., J. C., Milwaukee
Challenge Mach. Co., Grand Haven, Mich.
Delta Mfg. Co., Milwaukee
* Fletcher, B. F., Boston
Jones Machine Tool Wks. Inc., Philadelphia
Knu-Vise Products Co., Detroit
* Lombard Governor Corp., Ashland, Mass.
* Machine Products Corp., Detroit
Pacific Tool & Supply Co., Los Angeles
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
South Bend Tool & Die Co., South Bend, Ind.
* Starrett Co., L. S., Athol, Mass.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
* Tool Engineering Service Co., Nutley, N. J.
U. S. Tool Co., Inc., Ampere, N. J.

PLATFORMS, SKID (see **TRUCKS, Hand Lift**)

PLATING, Contract
Advance Specialty Co., Philadelphia
American Nickeloid Co., Peru, Ill.
Apollo Metal Works Co., Chicago
Chromium Corp. of America, N. Y. C.
Industrial Plating & Finishing Corp., Brooklyn, N. Y.
United Chromium Inc., N. Y. C.
United Platers, Inc., Detroit

PLATING EQUIPMENT & SUPPLIES
Alrose Chemical Co., Providence, R. I.
Belke Mfg. Co., Chicago
Crown Rheostat & Supply Co., Chicago
du Pont de Nemours & Co., E. I., Wilmington, Del.
Handy & Harmon, N. Y. C.
Hanson, Van Winkle & Munning Co., Matawan, N. J.
Heil & Co., Cleveland
Lasalco, Inc., St. Louis
Lea Mfg. Co., Waterbury, Conn.
Meaker Co., Chicago
Munning & Munning, Inc., Newark, N. J.
Ransohoff Inc., N., Carthage, Cincinnati
Sargent & Co., E. H., Chicago
Stevens, Inc., Frederic B., Detroit
Storts Welding Co., Meriden, Conn.
Udylite Co., Detroit
United Chromium, Inc., N. Y. C.
U. S. Galvanizing & Plating Equip. Corp., Brooklyn, N. Y.

POTENTIOMETERS
Biddle Co., James G., Philadelphia
Bristol Co., Waterbury, Conn.
* Brown Instrument Co., Philadelphia
* General Electric Co., Schenectady, N. Y.
Leeds & Northrup Co., Philadelphia
Tagliabue Co., C. J., Brooklyn, N. Y.
Wheelco Instruments Co., Chicago

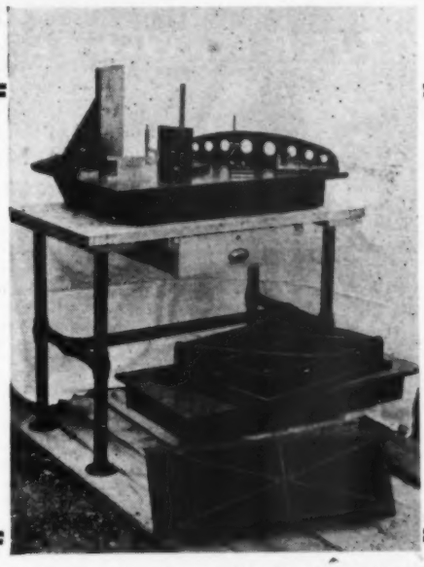
POTS, Melting
American Manganese Steel Div., Chicago Hgts., Ill.
Calorizing Co., Pittsburgh
Driver-Harris Co., Harrison, N. J.
* Farrel-Birmingham Co., Ansonia, Conn.
General Alloys Co., Boston
* General Electric Co., Schenectady, N. Y.
* Strong, Carlisle & Hammond Co., Cleveland
Struthers Dunn, Inc., Philadelphia
Trent Co., Harold E., Philadelphia
Vulcan Electric Co., Lynn, Mass.
* Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

PRESSES, Arbor
American Broach & Machine Co., Ann Arbor, Mich.
Atlas Press Co., Kalamazoo, Mich.
* Barnes Co., W. F. & John, Rockford, Ill.
Birdsboro Steel Fdy. & Mach. Co., Birdsboro, Pa.
Canedy-Otto Mfg. Co., Chicago Hgts, Ill.
Chambersburg Engrg. Co., Chambersburg, Pa.
Champion Blower & Forge Co., Lancaster, Pa.
Elmes Engrg. Wks., Chas. F., Chicago
* Famco Machine Co., Racine, Wis.
Greenerd Arbor Press Co., Nashua, N. H.
Hannifin Mfg. Co., Chicago
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Lake Erie Engrg. Corp., Buffalo, N. Y.
Logansport Machine Inc., Logansport, Ind.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
* Producto Machine Co., Bridgeport, Conn.
* Sheldon Machine Co., Chicago
Smith, Inc., Winfield H., Springville, Erie County, N. Y.
* Tomkins-Johnson Co., Jackson, Mich.
* Watson-Stillman Co., Roselle, N. J.
* Wilson, K. R. Buffalo, N. Y.

PRESSES, Crank (See **PRESSES, Power**)

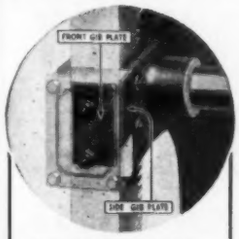
PRESSES, Foot
Baird Machine Co., Bridgeport, Conn.
Bliss Co., E. W., Brooklyn, N. Y.
* Etna Machine Co., Toledo, O.
* Famco Machine Co., Racine, Wis.
Ferracute Machine Co., Bridgeton, N. J.

SURFACE PLATES
suitable for finest tool work and inspection



ANGLE IRONS, STRAIGHT EDGES AND BRIDGE IRONS
Prices on application
B. F. FLETCHER
Manufacturer
28 CAMBRIA ST. BOSTON

SPEED UP PRODUCTION
CUT COSTS!



Only FAMCO Arbor Presses offer front and side gib adjustments for perfect ram alignment at all times.

America's war effort calls for speed. FAMCO Foot and Arbor Presses (floor and bench types) perform hundreds of production and assembly operations requiring pressure and percussion . . . better . . . faster . . . easier . . . cheaper. There are 40 stock models to choose from—each scientifically engineered and built for greater capacity, size for size, and trouble-free operation. Discard hand and makeshift methods for FAMCO efficiency. Write today for complete details — no obligation, of course. FAMCO MACHINE CO., 1800—18th St., Racine, Wis.

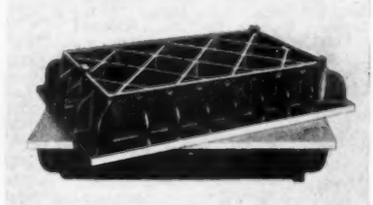
Floor type Arbor Press. Simple ratchet or combination compound leverage. 6 to 15 tons pressure.

Bench type Arbor Press made in a variety of sizes. From ½ to 12 tons pressure.

No. 15. Illustrates typical construction detail of all FAMCO stand mounted foot presses.

FAMCO FOOT AND ARBOR PRESSES

REID MASTER SURFACE PLATES



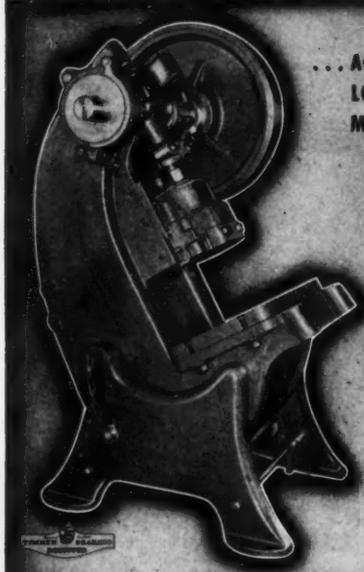
A necessity in every shop where high accuracy is desired

Rigidly constructed and 10% to 20% heavier than average plates of corresponding size. Guaranteed as to accuracy. Thoroughly normalized and weather seasoned, planed and scraped on same 3-point bearing on which they will rest in use. Furnished with planed or hand scraped surfaces in all standard sizes from 12" x 18" to 36" x 72". Reasonably prompt delivery on priority orders.

TOOL ENGINEERING SERVICE CO., Inc.
244 Washington Ave. NUTLEY, N. J.

FEDERAL

BUILT-FOR-SERVICE PRESSES



. . . ACCURATE, DEPENDABLE, LOW IN OPERATING AND MAINTENANCE COST!

In the purchase of presses, consider the FEDERAL features of accuracy, dependability, and low operating and maintenance costs.

V-ways are ½ longer than conventional presses . . . safety-lock and non-repeat mechanisms eliminate sources of danger . . . flywheel, roller bearing equipped, helps to lower operating cost and eliminates down-time due to bushing failures.

Here, then, is press economy in sizes from 6 to 80 tons. A FEDERAL open back inclinable press represents 40 years of specialized design and manufacture. Write for sizes, types, and delivery dates.

. . . The Proper Press For Your Job . . .

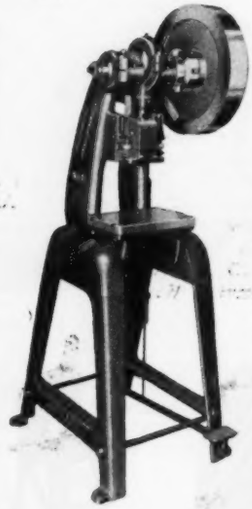
FEDERAL PRESS CO.

ELKHART • INDIANA

PROMPT DELIVERY

★ *on this*

HIGH-SPEED PUNCH PRESS



If you need more press production NOW, take advantage of this early delivery date—but don't delay! . . . Give those light jobs to smaller presses—like this Rousselle No. 1—and pocket the savings for your firm. TODAY—when the big machines are needed for full production on heavy work, invest in "high-speed-with-safety" Rousselles!

*** For full data, write, wire or phone TODAY**

Distributors: Few select territories still available.

DAVID J. ROSS CO.

BENTON HARBOR, MICH.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

PRESSES, Foot (Cont.)
Lake Erie Engrg. Corp., Buffalo, N. Y.
* Niagara Mach. & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Perkins Machine Co., Warren, Mass.
Royersford Foundry & Machine Co., Royersford, Pa.
Service Machine Co., Elizabeth, N. J.
Taylor & Fenn Co., Hartford, Conn.
* V. & O. Press Co., Hudson, N. Y.
Walsh Press & Die Co., Chicago
Waterbury Farrell Fdry. & Mach. Co., Waterbury, Conn.

PRESSES, Forging
* Ajax Mfg. Co., Euclid P. O., Cleveland
Alliance Mach. Co., Alliance, Ohio
Baldwin-Southwark Corp., Philadelphia
Bethlehem Steel Co., Bethlehem, Pa.
Bliss Co., E. W., Brooklyn, N. Y.
Chambersburg Engrg. Co., Chambersburg, Pa.
* Clearing Machine Corp., Chicago
* Cleveland Punch & Shear Works Co., Cleveland
Elmes Engrg. Wks., Chas. F., Chicago
Erie Foundry Co., Erie, Pa.
Farquhar Co., A. B., York, Pa.
Florence Pipe Fdry. & Machine Co., Florence, N. J.
Hannifin Mfg. Co., Chicago
* Hill-Acme Co., Cleveland
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Lake Erie Engrg. Corp., Buffalo, N. Y.
Mesta Machine Co., Pittsburgh
Minster Machine Co., Minster, O.
Morgan Engrg. Co., Alliance, O.
National Machinery Co., Tiffin, O.
* Niagara Mach. & Tool Works, Buffalo, N. Y.
Verson Allsteel Press Co., Chicago
* Watson-Stillman Co., Roselle, N. J.
Williams, White & Co., Moline, Ill.
Wood Co., R. D., Philadelphia
Zeh & Hahnemann Co., Newark, N. J.

PRESSES, Hydraulic
American Broach & Machine Co., Ann Arbor, Mich.
Anker Holth Mfg. Co., Port Huron, Mich.
Atlas Press Co., Kalamazoo, Mich.
Baldwin-Southwark Corp., Philadelphia
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Bliss, E. W., Brooklyn, N. Y.
Buckeye Iron & Brass Works, Dayton, O.
Chambersburg Engrg. Co., Chambersburg, Pa.
* Clearing Machine Corp., Chicago
Colonial Broach Co., Detroit
* Davis Keyseater Co., Rochester, N. Y.
Defiance Machine Works, Defiance, O.
* Denison Engrg. Co., Columbus, O.
Dunning & Boschert Press Co., Inc., Syracuse, N. Y.
Elmes Engrg. Wks., Chas. F., Chicago
Erie Foundry Co., Erie, Pa.
Farquhar Co., A. B., York, Pa.
* Farrel-Birmingham Co., Ansonia, Conn.
French Oil Mill Machry. Co., Piqua, O.
General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
Greenerd Arbor Press Co., Nashua, N. H.
Hanna Engrg. Works, Chicago
Hannifin Mfg. Co., Chicago
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Lake Erie Engrg. Corp., Buffalo, N. Y.
* Lapointe Machine Tool Co., Hudson, Mass.
Le Maire Tool & Mfg. Co., Dearborn, Mich.
Logansport Machine Inc., Logansport, Ind.
* Marburg Brothers, Inc., N. Y. C.
Mesta Machine Co., Pittsburgh
Morgan Engrg. Co., Alliance, O.
National Erie Corp., Erie, Pa.
Northern Engrg. Works, Toledo, O.
* Oilgear Co., Milwaukee
Seamless Steel Equipment Corp., N. Y. C.
* Tomkins-Johnson Co., Jackson, Mich.
Verson Allsteel Press Co., Chicago
Vulcan Iron Works, Chicago
Waterbury Farrell Fdry. & Mach. Co., Waterbury, Conn.
* Watson-Stillman Co., Roselle, N. J.
Williams, White & Co., Moline, Ill.
Wood Co., R. D., Philadelphia
* Wright Mfg. Div. Amer. Chain Co. Inc., Bridgeport, Conn.

PRESSES, Power (Punch)
Allsteel Press Co., Chicago
Automatic Machine Co., Bridgeport, Conn.
Automatic Mfg. Co., Harrison, N. J.
Baird Machine Co., Bridgeport, Conn.
Beatty Mach. & Mfg. Co., Hammond, Ind.
Bliss Co., E. W., Brooklyn, N. Y.
* Buffalo Forge Co., Buffalo, N. Y.
Chambersburg Engrg. Co., Chambersburg, Pa.
* Cincinnati Shaper Co., Cincinnati
* Clearing Mach. Co., Chicago
Cleveland Crane & Engrg. Co., Steelweld Machry. Div., Wickliffe, Ohio
* Cleveland Punch & Shear Works Co., Cleveland
* Consolidated Machine Tool Corp., Rochester, N. Y.
Contract Engineering Corp., Cleveland
* Davis Keyseater Co., Rochester, N. Y.
Dreis & Krump Mfg. Co., Chicago
Erie Foundry Co., Erie, Pa.
* Federal Press Co., Elkhart, Ind.
Ferracute Machine Co., Bridgeton, N. J.
Fox Machine Co., Jackson, Mich.
General Mfg. Co., Detroit
* Hendey Machine Co., Torrington, Conn.
Henderson Machine Co., Philadelphia
* Henry & Wright Mfg. Co., Hartford, Conn.
Hydraulic Press Mfg. Co., Mt. Gilead, Ohio
Kent-Owens Machine Co., Toledo, O.
Long & Allstatter Div. of Columbia Machine Tool Co., Hamilton, O.
Marshalltown Mfg. Co., Marshalltown, Ia.
Mesta Machine Co., Pittsburgh
* Mitts & Merrill, Saginaw, Mich.
Minster Machine Co., Minster, O.
* Niagara Mach. & Tool Works, Buffalo, N. Y.
* Oilgear Co., Milwaukee
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Henry, N. Y. C.
Perkins Machine Co., Warren, Mass.
Quickwork-Whiting Corp., Harvey Ill.
Rockford Iron Works, Rockford, Ill.
* Ross Co., David J., Benton Harbor, Mich.
Ryerson & Son, Inc., Jos. T., Chicago
* Schatz Mfg. Co., Poughkeepsie, N. Y.
Standard Machy. Co., Providence, R. I.
Super-Speed Press Corp., N. Y. C.
Taylor & Fenn Co., Hartford, Conn.
Thomas Machine Mfg. Co., Pittsburgh
Toledo Mach. & Tool Co., Toledo, O.
United Engrg. & Foundry Co., Pittsburgh
* V. & O. Press, Hudson, N. Y.
Verson Allsteel Press Co., Chicago
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.
* Wiedemann Machine Co., Philadelphia
Whitney Metal Tool Co., Rockford, Ill.
Williams, White & Co., Moline, Ill.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES, Turret Punch
Excelsior Tool & Machine Co., E. St. Louis, Ill.
* Federal Press Co., Elkhart, Ind.
Perkins Machine Co., Warren, Mass.
Wiedemann Machine Co., Philadelphia

PRESSES, Screw
Aerotool Works, Toronto, Canada
Bliss Co., E. W., Brooklyn, N. Y.

PRESSES,
FEEDS
AUTOMATIC EQUIPMENT

THE V & O Press Co., Inc.

HUDSON, N. Y.

WHERE-TO-BUY DIRECTORY

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Dunning & Boschert Press Co., Inc., Syracuse, N. Y.
Ferracute Machine Co., Bridgeton, N. J.
Minster Machine Co., Minster, O.
* Niagara Mach. & Tool Wks., Buffalo, N. Y.
Perkins Machine Co., Warren, Mass.
* Producto Machine Co., Bridgeport, Conn.
* Schatz Mfg. Co., Poughkeepsie, N. Y.
Standard Machinery Co., Providence, R. I.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES, Straightening
Atlas Press Co., Kalamazoo, Mich.
Baldwin-Southwark Corp., Philadelphia
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
* Cleveland Punch & Shear Works Co., Cleveland
* Consolidated Machine Tool Corp., Rochester, N. Y. (Hilles & Jones Div.)
Elmes Engrg. Wks., Chas. F., Chicago
Farquhar Co., A. B., Ltd., York, Pa.
General Mfg. Co., Detroit
Greenerd Arbor Press Co., Nashua, N. H.
Hannifin Mfg. Co., Chicago
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Lake Erie Engrg. Corp., Buffalo, N. Y.
Mesta Machine Co., Pittsburgh
Morse Twist Drill & Mach. Co., New Bedford, Mass.
* Oilgear Co., Milwaukee
Rockford Iron Works, Rockford, Ill.
* Springfield Machine Tool Co., Springfield, O.
United Engrg. & Foundry Co., Pittsburgh
* Watson-Stillman Co., Roselle, N. J.
Western Tool & Mfg. Co., Springfield, O.
Williams, White & Co., Moline, Ill.
Wood Co., R. D., Philadelphia

PROFILERS (See **MILLERS, Vertical**)

PROJECTORS, Contour
Bausch & Lomb Optical Co., Rochester, N. Y.
* Jones & Lamson Machine Co., Springfield, Vt.
Portman Machine Tool Co., Mt. Vernon, N. Y.
* Scherr Co., Geo., N. Y. C.
Zeiss, Carl, N. Y. C.

PROTRACTORS, Optical
Bausch & Lomb Optical Co., Rochester, N. Y.
* Scherr Co., Geo., N. Y. C.
Zeiss, Carl, N. Y. C.

PULLERS, Gear & Wheel
Armstrong-Bray & Co., Chicago
Edelbiute Mfg. Co., Reynoldsville, Pa.
* General Electric Co., Schenectady, N. Y.
Martindale Electric Co., Cleveland
Owatonna Tool Co., Owatonna, Minn.
Springfield Wheel Puller Co., Springfield, O.
* Williams & Co., J. H., N. Y. C.

PULLEY COVERING, Non-Slip
Nonslip Pulley Covering Co., Buffalo, N. Y.

PULLEYS, Iron, Steel & Wood
American Pulley Co., Philadelphia
Boston Gear Works, Inc., N. Quincy, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Carlyle, Johnson Machine Co., Manchester, Conn.
Diamond Chain & Mfg. Co., Indianapolis
* Dodge Mfg. Corp., Mishawaka, Ind.
Link-Belt Co., Chicago
Medart Co., St. Louis
Reeves Pulley Co., Columbus, Ind.
Rockwood Mfg. Co., Indianapolis
Royersford Fdry. & Mach. Co., Royersford, Pa.

PULLEYS, V-Belt (see **Sheaves, V-Belt**)

PULLEYS, Vacuum Cup, C. I.
Vacuum Cup Metal Pulley Co., Inc., Detroit

PUMPS, Centrifugal
Allis-Chalmers Mfg. Co., Milwaukee
* Brown & Sharpe Mfg. Co., Providence, R. I.
DeLaval Steam Turbine Co., Trenton, N. J.
Fairbanks, Morse & Co., Chicago
Fulflo Specialties Co., Blanchester, O.
* Gilbert & Barker Mfg. Co., Springfield, Mass.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Ingersoll-Rand Co., N. Y. C.
Pioneer Engrg. & Mfg. Co., Detroit
* Ruthman Machry. Co., Cincinnati
* Tomkins-Johnson Co., Jackson, Mich.
Worthington Pump & Mchy. Corp., Harrison, N. J.

PUMPS, Hydraulic
Allis-Chalmers Mfg. Co., Milwaukee
Baldwin-Southwark Corp., Philadelphia
* Barnes Co., W. F. & John, Rockford, Ill.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
DeLaval Steam Turbine Co., Trenton, N. J.
Dowty Equipment Corp., Long Island City, N. Y.
Dunning & Boschert Press Co., Inc., Syracuse, N. Y.
Elmes Engrg. Wks., Chas. F., Chicago
Fairbanks, Morse & Co., Chicago
Goulds Pumps, Inc., Seneca Falls, N. Y.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Ingersoll-Rand Co., N. Y. C.
Lake Erie Engrg. Corp., Long Island City, N. Y.
Lake Erie Engrg. Corp., Buffalo, N. Y.
* Lapointe Mach. Tool Co., Hudson, Mass.
* Oilgear Co., Milwaukee
* Racine Tool & Machine Co., Racine, Wis.
Rotary Lift Co., Memphis, Tenn.
* Sundstrand Mach. Tool Co., Rockford, Ill.
* Vickers Inc., Detroit
* Watson-Stillman Co., Roselle, N. J.
Wood Co., R. D., Philadelphia
Worthington Pump & Machy. Corp., Harrison, N. J.

PUMPS, Lubricant and Coolant
* Bijur Lubricating Corp., L. I. City, N. Y.
* Brown & Sharpe Mfg. Co., Providence, R. I.

THE TYPE R-4P
a powerful motor driven deep throat
TURRET PUNCH

This machine offers three standard throat depths—18", 24" and 28". It is furnished with 12 punches and dies up to 1¼" dia., mounted in a revolving turret, and is designed for rapid, continuous duty—is safe, convenient, fast and powerful. Punches can be easily and safely brought down to center punched layout by handwheel on even the thinnest sheets.
Write for detailed specifications.

WIEDEMANN MACHINE COMPANY
1815-31 SEDGLEY AVE.
PHILADELPHIA, PENN.

Strainers NOT NECESSARY with

MODEL P3

P3 Models are available in external right or left discharge models, flange-mounted and immersed models.

RUTHMAN
GUSHER
COOLANT PUMPS

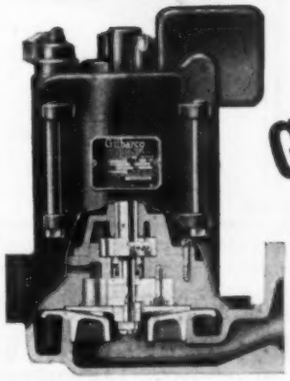
No metal-to-metal contacts . . . not injured by small chips and grit . . . no *strainers* necessary. Handles non-lubricating liquids such as lapping, honing and grinding compounds.

Sturdy vertical shaft on ball bearings, double suction intake giving balanced impeller are money-saving features.

A complete line of Gusher Coolant Pumps from 1/30 to 2 H.P. in types and capacities up to 200 gal. per minute. Speed your jobs! Write for data.

THE RUTHMAN MACHINERY CO.
1809 READING ROAD, CINCINNATI, OHIO
LARGEST EXCLUSIVE BUILDERS OF COOLANT PUMPS

READY FOR IMMEDIATE DELIVERY



GILBARCO COOLANT PUMPS

● Standard equipment on many internationally known machine tools, the new Gilbarco Centrifugal Coolant Pump is now available in any quantities. Equipped with ¼ H.P. explosion-resisting motors for all voltages, including polyphase, 115 or 230 volts D. C. These dependable pumps will handle up to 15 gallons per minute. Durable—low in price—a product of one of the country's largest pump makers. Wire or write at once for descriptive bulletin and prices!

GILBERT & BARKER MFG. CO.
WEST SPRINGFIELD, MASS.

WHERE-TO-BUY DIRECTORY

** Indicates further information to be found in advertising pages.*

PUMPS, Lubricant and Coolant (Cont.)
* Buffalo Forge Co., Buffalo, N. Y.
DeLaval Steam Turbine Co., Trenton, N. J.
Eddington Metal Spec. Co., Eddington, Pa.
Fairbanks, Morse & Co., Chicago
Fulflo Specialties Co., Blanchester, O.
* Gilbert & Barker Mfg. Co., Springfield, Mass.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Ingersoll-Rand Co., N. Y. C.
Pioneer Engrg. & Mfg. Co., Detroit
* Rivett Lathe & Grinder, Inc., Boston
* Ruthman Machinery Co., Cincinnati
* Sundstrand Mach. Tool Co., Rockford, Ill.
* Tomkins-Johnson Co., Jackson, Mich.
* Vickers, Inc., Detroit
Viking Pump Co., Cedar Falls, Iowa

PUNCHES, Center & Hand (See TOOLS, Hand)

PURIFIERS, Oil & Coolant
Barrett Co., Leon J., Worcester, Mass.
Cuno Engrg. Co., Meriden, Conn.
Detroit Lubricator Co., Detroit
Fauver Co., J. N., Detroit
Felters Co., Inc., Boston
Fostoria Pressed Steel Corp., Fostoria, O.
Motor Improvements, Inc., Newark, N. J.
North American Mfg. Co., Cleveland, O.
Skinner Devices, Inc., Detroit

PYROMETERS, Indicating & Recording
Bristol Co., Waterbury, Conn.
* Brown Instrument Co., Philadelphia
Foxboro Co., Foxboro, Mass.
Gordon Co., Claud S., Chicago
Hoskins Mfg. Co., Detroit
Illinois Testing Lab., Inc., Chicago
Leeds & Northrup Co., Philadelphia
Pyrometer Instrument Co., N. Y. C.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Co., Rochester, N. Y.
Thwing-Albert Inst. Co., Philadelphia
Wheelco Instruments Co., Chicago

QUENCHERS
* American Gas Furnace Co., Eliabeth, N. J.
* Electric Furnace Co., Salem, O.
* Farrel-Birmingham Co., Buffalo, N. Y.
* Gleason Works, Rochester, N. Y.
Urschel Engrg. Co., Bowling Green, O.

RACKS, Steel
All-Steel-Equip. Co., Aurora, Ill.
* Armstrong Bros. Tool Co., Chicago
Barrett-Cravens Co., Chicago
Cincinnati Tool Co., Cincinnati
Lewis-Shepard Sales Corp., Watertown, Mass.
Lyon Metal Products, Aurora, Ill.
Stackbin Corp., Providence, R. I.

RACKS, Gear (see GEARS, Cut)

RASPS (See FILES & RASPS)

RATCHETS (see GEARS, Cut)

REAMERS, Adjustable
* Barber-Colman Co., Rockford, Ill.
Carboloy Co., Detroit
* Cleveland Twist Drill Co., Cleveland
Colonial Broach Co., Detroit
Davis Boring Tool Co. (Div. Larkin Packer Co.), St. Louis
Evans Flexible Reamer Co., Chicago
Fansteel Metallurgical Corp., N. Chicago, Ill.
Foster Machine Co., Elkhart, Ind.
* Gairing Tool Co., Detroit
* Gisholt Machine Co., Madison, Wis.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hannifin Mfg. Co., Chicago
Ingersoll Milling Mach. Co., Rockford, Ill.
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McCrosky Tool Corp., Meadville, Pa.
Michigan Tool Co., Detroit
* Midwest Tool & Mfg. Co., Detroit
Morse Twist Drill & Mach. Co., New Bedford, Mass.
* National Tool Co., Cleveland
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Putnam Tool Co., Detroit
* Scully-Jones & Co., Chicago
Standard Tool Co., Cleveland
Super Tool Company, Detroit
Taft-Peirce Mfg. Co., Woonsocket, R. I.
* Union Twist Drill Co., Athol, Mass.

REAMERS, Pipe
* American Swiss File & Tool Co., Elizabeth, N. J.
* Armstrong Bros. Tool Co., Chicago
Beaver Pipe Tools, Inc., Warren, O.
* Butterfield Div. Union Twist Drill Co., Derby Line, Vt.
* Card Mfg. Co., S. W., Mansfield, Mass.
* Cleveland Twist Drill Co., Cleveland
Detroit Tap & Tool Co., Detroit
* Gairing Tool Co., Detroit
Greenfield Tap & Die Corp., Greenfield, Mass.
Ingersoll-Rand Co., N. Y. C.
Michigan Tool Co., Detroit
Morse Twist Drill & Machine Co., New Bedford, Mass.
* National Twist Drill & Tool Co., Detroit
Oster Mfg. Co., Cleveland
Standard Tool Co., Cleveland
* Torrington Co., Torrington, Conn.
Walworth Co., N. Y. C.

REAMERS, Power
* Catskill Metal Works, Catskill, N. Y.
Chicago Pneumatic Tool Co., N. Y. C.
* Cleveland Pneu. Tool Co., Cleveland
Enterprise Machine Parts Corp., Detroit
Independent Pneu. Tool Co., Chicago
Rotor Tool Co., Cleveland

REAMERS, Shell
* Butterfield Div. Union Twist Drill Co., Derby Line, Vt.
Carbolov Co., Inc., Detroit
* Cleveland Twist Drill Co., Cleveland
Gammons-Holman Co., Manchester, Conn.
Goddard & Goddard Co., Detroit
Greenfield Tap & Die Corp., Greenfield, Mass.
Illinois Tool Works, Chicago
* Morse Tool Co., Detroit
Morse Twist Drill & Machine Co., New Bedford, Mass.
* National Twist Drill & Tool Co., Detroit
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Union Twist Drill Co., Athol, Mass.
Whitman & Barnes, Detroit

REAMERS, Solid
* Barber-Colman Co., Rockford, Ill.
* Butterfield Div. Union Twist Drill Co., Derby Line, Vt.
Carboloy Co., Detroit
* Cleveland Twist Drill Co., Cleveland
Colonial Broach Co., Detroit
Davis Boring Tool Co. (Div. Larkin Packer Co.), St. Louis
Detroit Tap & Tool Co., Detroit
* Ex-Cell-O Corp., Detroit
Fansteel Metallurgical Corp., N. Chicago, Ill.
* Gairing Tool Co., Detroit
Gammons Holman Co., Manchester, Conn.
* Gisholt Machine Co., Madison, Wis.
Gorham Tool Co., Detroit
Greenfield Tap & Die Corp., Greenfield, Mass.
* Haynes Stellite Co., N. Y. C.
* Holman Reamer Co., Manchester, Conn.
Illinois Tool Works, Chicago
Michigan Tool Co., Detroit
Morse Twist Drill & Mach. Co., New Bedford, Mass.
* National Tool Co., Cleveland
* National Twist Drill & Tool Co., Detroit
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Scully-Jones & Co., Chicago
Standard Tool Co., Cleveland
Taft-Peirce Mfg. Co., Woonsocket, R. I.
* Union Twist Drill Co., Athol, Mass.
Whitman & Barnes, Detroit

REAMING MACHINES
* Barnes Co., W. F. & John, Rockford, Ill.
* Van Norman Machine Tool Co., Springfield, Mass.

RECORDERS, Speed (See INDICATORS, Speed)

RECORDERS, Temperature & Pressure
Bristol Co., Waterbury, Conn.
* Brown Instrument Co., Philadelphia
Foxboro Co., Foxboro, Mass.
Hoskins Mfg. Co., Detroit
Leeds & Northrup Co., Philadelphia
Marsh Corp., Jas. P., Chicago
Partlow Corp., Hartford, N. Y.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Co., Rochester, N. Y.
Thwing-Albert Inst. Co., Philadelphia

RECORDERS, Time
Bristol Co., Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
International Business Machines Corp., N. Y. C.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.

RECTIFIERS, Electric Power
Allis-Chalmers Mfg. Co., Milwaukee
Cassels Engrg. & Mach. Co., Wauwatosa, Wis.
* General Electric Co., Schenectady, N. Y.
Janette Mfg. Co., Chicago
Raytheon Mfg. Co., Waltham, Mass.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
* Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

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Foote Gear Works, Inc., Cicero, Ill.
Foote Bros. Gear & Mach. Corp., Chicago
* Ganschow Gear Co., Chicago
* Gear Specialties, Inc., Chicago
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James Mfg. Co., D. O., Chicago
Janette Mfg. Co., Chicago
Lima Armature Works, Lima, O.
Link-Belt Co., Philadelphia
Mechanical Specialties, Inc., Chicago
* Meisel Press Mfg. Co., Boston, Mass.
Ohio Gear Co., Cleveland
Palmer-Bee Co., Detroit, Mich.
Philadelphia Gear Works, Philadelphia
* Reliance Elec. & Engrg. Co., Cleveland
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Sterling Elec. Motors, Inc., Los Angeles
U. S. Elec. Motors, Inc., Los Angeles
Wagner Electric Corp., St. Louis
* Westinghouse Elec. & Mfg. Co., E. Pittsburgh

REDUCERS, Speed
Abart Gear & Machine Co., Chicago
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Bodine Electric Co., Chicago
Bond Co., Chas., Philadelphia
Boston Gear Works, Inc., No. Quincy, Mass.
* Cullman Wheel Co., Chicago
* Davis & Thompson Co., Milwaukee
DeLaval Steam Turbine Co., Trenton, N. J.
* Earle Gear & Machine Co., Philadelphia
* Farrel-Birmingham Co., Buffalo, N. Y.
Foote Gear Works, Inc., Cicero, Ill.
* Ganschow Gear Co., Chicago
* Gear Specialties, Inc., Chicago
* General Electric Co., Schenectady, N. Y.
General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O
* Grant Gear Works, Inc., So. Boston, Mass.
James Mfg. Co., D. O., Chicago
Janette Mfg. Co., Chicago
Lee & Son, Inc., K. O., Aberdeen, S. D.
Link Belt Co., Chicago
Morse Chain Co., Ithaca, N. Y.
Ohio Gear Co., Cleveland
* Oilgear Co., Milwaukee
Philadelphia Gear Works, Philadelphia
* Racine Tool & Machine Co., Racine, Wis.
Smith, Inc., Winfield H., Springville, N. Y.
Stahl Gear & Machine Co., Cleveland
* Sundstrand Mach. Tool Co., Rockford, Ill.
* Vickers, Inc., Detroit
* Watson-Stillman Co., Roselle, N. J.
* Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
Wood Co., R. D., Philadelphia
Worthington Pump & Machy. Corp., Harrison, N. J.

REELS, Strip-Stock
American Pulley Co., Philadelphia
Baird Machine Co., Bridgeport, Conn.
* Littell Machine Co., F. J., Chicago
Quickwork-Whiting Corp., Harvey, Ill.
U. S. Tool Co., Ampere, N. J.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.
Yoder Co., Cleveland

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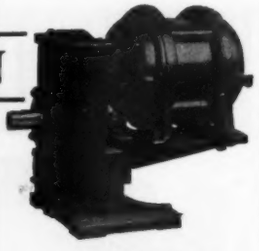

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* Strong, Carlisle & Hammond Co., Cleveland

REGULATORS, Oxygen & Acetylene
Air Reduction Sales Co., N. Y. C.
Linde Air Products Co., N. Y. C.
National Cylinder Gas Co., Chicago

REGULATORS, Speed
Cutler-Hammer, Inc., Milwaukee
* General Electric Co., Schenectady, N. Y.
Link-Belt Co., Philadelphia
* Vickers, Inc., Detroit
* Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

REGULATORS, Temperature
* American Gas Furnace Co., Elizabeth, N. J.
Automatic Temp. Control Co., Pittsburgh
* Barber-Colman Co., Rockford, Ill.
Bristol Company, Waterbury, Conn.
* Brown Instrument Co., Philadelphia
Foxboro Co., Foxboro, Mass.
Leeds & Northrup Co., Philadelphia
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Taylor Instrument Co., Rochester, N. Y.
Wheelco Instruments, Chicago

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* American Optical Co., Southbridge, Mass.
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Chicago Eye Shield Co., Chicago
Cover, H. S., South Bend, Ind.
Pangborn Corp., Hagerstown, Md.
Willson Products, Inc., Reading, Pa.

RIFLING MACHINES, Gun
American Broach & Machine Co., Div. Sundstrand Mach. Tool Co., Ann Arbor, Mich.
Builders Iron Foundry, Providence, R. I.
Illinois Tool Works, Chicago.
* LeBlond Machine Tool Co., R. K., Cincinnati, O.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.

RIVETERS, Electric Power
* Buffalo Forge Co., Buffalo, N. Y.
Chicago Rivet & Machine Co., Chicago
* Grant Mfg. & Machine Co., Bridgeport, Conn.
High Speed Hammer Co., Inc., Rochester, N. Y.
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Milford Rivet & Machine Co., Milford, Conn.
North Engrg. Co., Chicago
Penn Rivet Corp., Philadelphia
* Tompkins-Johnson Co., Jackson, Mich.
Tubular Rivet & Stud Co., Boston
Whitney Metal Tool Co., Rockford, Ill.

RIVETERS, Pneumatic & Hydraulic
Baldwin-Southwark Corp., Philadelphia
Birdsboro Steel Bdry. & Mach. Co., Birdsboro, Pa.
Chambersburg Engrg. Co., Chambersburg, Pa.
Chicago Pneumatic Tool Co., N. Y. C.
* Cleveland Pneu. Tool Co., Cleveland
Elmes Engrg. Wks., Chas. F., Chicago
Hanna Engrg. Works, Chicago
Hannifin Mfg. Co., Chicago
Independent Pneu. Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
Lake Erie Engrg. Corp., Buffalo, N. Y.
* Niagara Mach. & Tool Wks., Buffalo, N. Y.
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* Watson-Stillman Co., Roselle, N. J.
Williams, White & Co., Moline, Ill.

RIVETS
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* American Steel & Wire Co. (U. S. Steel Subsidiary), Pittsburgh
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Bridgeport Screw Co., Bridgeport, Conn.
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Chase Brass & Copper Co., Waterbury, Conn.
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Lamson & Sessions Co., Cleveland
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Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
Tubular Rivet & Stud Co., Boston

ROLLS, Bending
Baldwin-Southwark Co., Philadelphia
* Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
* Cleveland Punch & Shear Works Co., Cleveland
* Consolidated Machine Tool Corp., Rochester, N. Y.
General Machinery Corp., (Niles Tool Wks. Div.), Hamilton, O.
Hendley & Whittemore Co., Beloit, Wis.
Kane & Roach, Syracuse, N. Y.
Mesta Machine Co., Pittsburgh
* Niagara Mach. & Tool Wks. Buffalo, N. Y.
Peck, Stow & Wilcox, Southington, Conn.
Quickwork-Whiting Corp., Harvey, Ill.
Ryerson & Son, Jos. T., Chicago
Thomas Machine Mfg. Co., Pittsburgh
United Engrg. & Fdry. Co., Pittsburgh
Wickes Bros., Saginaw, Mich.

ROLLS, Forging
* Ajax Mfg. Co., Cleveland
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Erie Forge Co., Erie, Pa.
Heppenstall Co., Pittsburgh
Williams, White & Co., Moline, Ill.

ROPE, Wire
* American Cable Div. of Am. Chain & Cable Co., N. Y. C.
Bethlehem Steel Co., Bethlehem, Pa.
Hazard Wire Rope Div. Am. Chain & Cable Co., N. Y. C.
Leschen & Sons Rope Co., A., St. Louis
National Production Co., Detroit
* Roebling's Sons Co., John A., Trenton, N. J.
Ryerson & Son, Jos. T., Chicago
Wickwire-Spencer Steel Co., N. Y. C.

ROUTERS
Challenge Machy. Co., Grand Haven, Mich.
* Consolidated Mach. Tool Corp., Rochester, N. Y. (Hilles & Jones Div.)
* Gorton Machine Co., Geo., Racine, Wis.
* Knight Machy. Co., W. B., St. Louis
* Onsrud Machine Works, Chicago.
* Reed-Prentice Corp., Worcester, Mass.

RUBBER PRODUCTS
American Hard Rubber Co., N. Y. C.
Luzerne Rubber Co., Trenton, N. J.
Goodrich Co., B. F., Akron, Ohio
Goodyear Tire & Rubber Co., Akron, O.
Richardson Co., Indianapolis
Stokes Rubber Co., Jos., Trenton, N. J.
Tech-Art Plastics Co., Long Island City, N. Y.
Universal Moulding Co., San Francisco
Vulcanized Rubber Co., N. Y. C.
Waterbury Button & Mfg. Co., Waterbury, Conn.
Western Rubber Co., Goshen, Ind.

RULES, Machinists'
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Lufkin Rule Co., Saginaw, Mich.
Stanley Tools, New Britain, Conn.
* Starrett Co., L. S., Athol, Mass.

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Estox Products Co., New Haven, Conn.
Fales Chem. Co., Inc., N. Y. C.
Goodrich Company, B. F., Akron, O.
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Holden Co., A. F., New Haven, Conn.
Houghton & Co., E. F. Philadelphia
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Michigan Chrome Co., Detroit
Never Rust Mfg. Co., Brooklyn, N. Y.
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* Standard Oil Co. of Indiana, Chicago
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Udylite Co., Detroit
Wayne Chemical Products, Div. Wayne Soap Co., Detroit

SALVAGING, Tool
* Abrasive Engrg. Corp., Spring Lake, Mich.
Chartier Tool Holder Co., Chicago
Chicago Tool Reclaiming Co., Chicago
National Tool Salvage Co., Detroit

SAND & SHOT BLAST MACHINES
American Fdry. Equipt. Co., Milwaukee
Koven & Bro., L. O. Jersey City, N. J.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., Cleveland

SANDERS, Machine & Portable
American Saw Mill Machinery Co., Hackettstown, N. J.
* Black & Decker Mfg. Co., Towson, Md.
Buckeye Portable Tool Co., Dayton, O.
* Carborundum Co., Niagara Falls, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Pneumatic Tools Co., N. Y. C.
Clark, Jr., Electric Co., Jas., Louisville, Ky.
Delta Mfg. Co., Milwaukee
Detroit Surfacing Machine Co., Detroit
* Haskins Co., R. G., Chicago
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
* Jefferson Machine Tool Co., Cincinnati
Mall Tool Co., Chicago
* Mattison Machine Works, Rockford, Ill.
Mead Specialties Co., Chicago
Milwaukee Elec. Tool Corp., Milwaukee
Porter-Cable Mach. Co., Syracuse, N. Y.
Production Machine Co., Greenfield, Mass.
Rotor Air Tool Co., Cleveland
* Skilsaw, Inc., Chicago
Stanley Electric Tool Div., Stanley Works, New Britain, Conn.
Sterling Products Co., Detroit
Stow Mfg. Co., Binghamton, N. Y.
* Strand Co., N. A., Chicago
Syracuse Guide Tool Co., Syracuse, N. Y.
U. S. Electrical Tool Co., Cincinnati
Van Dorn Elec. Tool Co., Towson, Md.
* Walker-Turner Co., Plainfield, N. J.
* Walls Sales Corp., N. Y. C.

SAW BLADES, Circular Metal-Cutting
Atkins & Co., E. C., Indianapolis
* Barber-Colman Co., Rockford, Ill.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Butterfield Div. Union Twist Drill Co., Derby Line, Vt.
Carboloy Co., Detroit
Circular Tool Co., Providence, R. I.
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* National Twist Drill & Tool Co., Detroit
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Standard Tool Co., Cleveland
Wesson Co., Detroit

SAW BLADES, Hack & Band (See BLADES, Hack & Band-Saw)

SAWS, Band, Metal-Cutting (Machines)
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Atkins & Co., E. C., Indianapolis
* Avey Drilling Mach. Co., Cincinnati
Barnes Co., Inc., W. O., Detroit
Black Diamond Saw & Mach. Wks., Natick, Mass.
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Delta Mfg. Co., Milwaukee
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* Marburg Bros., Inc., N. Y. C.
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Tannewitz Works, Grand Rapids, Mich.
* Walker-Turner Co., Plainfield, N. J.
Wells Mfg. Co., Three Rivers, Mich.

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* Consolidated Mach. Tool Corp., Rochester, N. Y. (Newton Div.)
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
* Earle Gear & Machine Co., Philadelphia
Heller Machine Co., N. Y. C.
Huther Bros. Saw & Mfg. Co., Rochester, N. Y.
Kane & Roach, Inc., Syracuse, N. Y.
* Motch & Merryweather Co., Cleveland
* Porter-McLeod Machine Tool Co., Hatfield, Mass.

SAWS, Circular, Wood-Cutting (Machine)
American Saw Mill Machinery Co., Hackettstown, N. J.
Atkins & Co., E. C., Indianapolis
Curtis Pneumatic Machy. Co., St. Louis
Delta Mfg. Co., Milwaukee
DeWalt Products Corp., Lancaster, Pa.
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
* Mattison Machine Works, Rockford, Ill.
Machine Tool Co., Detroit
Oliver Machy. Co., Grand Rapids, Mich.
* Walker-Turner Co., Inc., Plainfield, N. J.

SAWS, Friction
Bethlehem Fdry. & Mach. Co., Bethlehem, Pa.
Ryerson & Son, Inc., Jos. T., Chicago
United Engrg. & Fdry. Co., Pittsburgh

SAWS, Hack (See TOOLS, Hand)

SAWS, Hole
* Armstrong-Blum Co., Chicago
Atkins & Co., E. C., Indianapolis
* Black & Decker Mfg. Co., Towson, Md.
D. & D. Tool Co., Seattle, Wash.
Millers Falls Co., Greenfield, Mass.
Misener Mfg. Co., Syracuse, N. Y.
R & L Tool Co., Philadelphia
* Skilsaw, Inc., Chicago
Stanley Electric Tool Div., Stanley Works, New Britain, Conn.
Van Dorn Elec. Tool Co., Towson, Md.

SAWS, Portable (See TOOLS, Portable)

SAWS, Power Hack
* Armstrong-Blum Mfg. Co., Chicago
* Atkins & Co., E. C., Indianapolis
* Capewell Mfg. Co., Hartford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Cochrane-Bly Co., Rochester, N. Y.
Covel Mfg. Co., Be ton Harbor, Mich.
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* L-W Chuck Co., Toledo, Ohio
* Marburg Brothers, Inc., N. Y. C.
Oster Mfg. Co., Cleveland
Peerless Machine Co., Racine, Wis.
* Racine Tool & Mach. Co., Racine, Wis.
Rasmussen Machine Co., Racine, Wis.
Ryerson & Son, Inc., Jos. T., Chicago
Wells Mfg. Corp., Three Rivers, Mich.

SCALES, Weighing & Counting
* Brown & Sharpe Mfg. Co., Providence, R. I.
Exact Weight Scale Co., Columbus, O.
Fairbanks, Morse & Co., Chicago
Howe Scale Co., Rutland, Vt.
Standard Computing Scale Co., Detroit
Toledo Scale Co., Toledo, O.

SCRAPERS, Belt
Atkins & Co., E. C., Indianapolis
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
Graton & Knight Co., Worcester, Mass.
Link-Belt Co., Chicago
Rhoads & Sons, J. E., Philadelphia
Stephens-Adamson Mfg. Co., Aurora, Ill.

SCRAPERS, Hand (See TOOLS, Hand)

SCRAPERS, Power
Anderson Bros. Mfg. Co., Rockford, Ill.
* Black & Decker Mfg. Co., Towson, Md.

SCREWDRIVERS, Flexible-Shaft (See TOOLS, Flexible-Shaft)

SCREWDRIVERS, Hand (See TOOLS, Hand)

SCREWDRIVERS, Portable Electric & Pneumatic (See TOOLS, Portable)

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Detroit Power Screwdriver Co., Detroit
* Haskins Co., R. G., Chicago
Millers Falls Co., Greenfield, Mass.
Procunier Safety Chuck Co., Chicago
* Producto Machine Co., Bridgeport, Conn.
* Schauer Machine Co., Cincinnati
* Strand & Co., N. A., Chicago

SCREW-MACHINES, Automatic
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Cleveland Automatic Mach. Co., Cleveland
* Cone Automatic Mach. Co., Windsor, Vt.
Cosa Oversea Trading Corp., N. Y. C.
Davenport Mach. Tool Co., Rochester, N. Y.
* Foote-Burt Co., Cleveland
Foster Machine Co., Elkhart, Ind.
Greenlee Bros. & Co., Rockford, Ill.
* National Acme Co., Cleveland
* New Britain-Gridley Mach. Div., New Britain Mach. Co., New Britain, Conn.
* Scherr Co., Inc., George, N. Y. C.
Windsor Automatic Co., Inc., Windsor, Vt.

SCREW-MACHINES, Plain & Hand
Acme Machine Tool Co., Cincinnati
* Brown & Sharpe Mfg. Co., Providence, R. I.
Brown Machine Co., Chicago
* Cleveland Automatic Mach. Co., Cleveland
Foster Machine Co., Elkhart, Ind.
* Gisholt Machine Co., Madison, Wis.
Hardinge Brothers, Inc., Elmira, N. Y.
* Jones & Lamson Machine Co., Springfield, Vt.
* Millholland Machy. Co., Indianapolis
Modern Collet & Machine Co., Detroit
* National Acme Co., Cleveland
* Rivett Lathe & Grinder Inc., Boston
Stark Tool Co., Waltham, Mass.
* Warner & Swasey Co., Cleveland

SCREW PLATES (See DIES, Screw-Cutting, Adjustable)

SCREWS, Cap and Set
* Allen Mfg. Co., Hartford, Conn.
* Baumbach Mfg. Co., E. A., Chicago
Bristol Company, Waterbury, Conn.
Cap Screw & Nut Co., N. Y. C.
Clark Bros. Bolt Co., Millidale, Conn.
* Danly Machine Specialties, Inc., Chicago
Dardelet Threadlock Corp., N. Y. C.
Holo-Krome Screw Corp., Hartford, Conn.
Lamson & Sessions Co., Cleveland
* National Acme Co., Cleveland
* Parker-Kalon Corp., N. Y. C.
* Republic Steel Corp., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
Shakeproof Lock Washer Co., Chicago
* Standard Pressed Steel Co., Jenkintown, Pa.
* Strong, Carlisle & Hammond Co., Cleveland

SCREWS, Machine
* Allen Mfg. Co., Hartford, Conn.
Bristol Company, Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Dardelet Threadlock Corp., N. Y. C.
Harper Co., H. M., Chicago
Holo-Krome Screw Corp., Hartford, Conn.
Lamson & Sessions Co., Cleveland
Nielsen Tool & Die Co., Berkeley, Mich.
Ohio Nut & Bolt Co., Berea, O.
Progressive Mfg. Co., Torrington, Conn.
R & L Tools, Nicetown, Philadelphia
* Republic Steel Co., Cleveland
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
* Strong, Carlisle & Hammond Co., Cleveland

SCREWS, Recessed Head
American Screw Co., Providence, R. I.
* Central Screw Co., Chicago
* Chandler Products Corp., Cleveland
* Continental Screw Co., New Bedford, Mass.
* Corbin Screw Corp., New Britain, Conn.
* International Screw Co., Detroit
* Lamson & Sessions Co., Cleveland
* National Screw & Mfg. Co., Cleveland
* New England Screw Co., Keene, N. H.
* Parker Co., Charles, Meriden, Conn.
* Parker-Kalon Corp., N. Y. C.
* Pawtucket Screw Co., Pawtucket, R. I.
* Pheoll Mfg. Co., Chicago
* Phillips Licensees, Providence, R. I.
* Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
* Scovill Mfg. Co., Waterbury, Conn.
* Shakeproof Lock Washer Co., Chicago
* Southington Hardware Co., Southington, Conn.
* Standard Pressed Steel Co., Jenkintown, Pa.
* Whitney Screw Corp., Nashua, N. H.

SCREWS, Self-Tapping
Corbin Screw Corp., New Britain, Conn.
* Parker-Kalon Corp., N. Y. C.
Pheoll Mfg. Co., Chicago
Shakeproof Lock Washer Co., Chicago

SCREWS, Thumb & Wing
American Screw Co., Providence, R. I.
Billings & Spencer Co., Hartford, Conn.
California Screw Co., San Francisco
Corbin Screw Corp., New Britain, Conn.
Harper Co., H. M., Chicago
Haskell Mfg. Co., Wm. H., Pawtucket, R. I.
National Screw & Mfg. Co., Cleveland
* Parker-Kalon Corp., N. Y. C.
Pheoll Mfg. Co., Chicago
United Screw & Bolt Corp., Cleveland
* Williams & Co., J. H., N. Y. C.

SCREWS, Transfer
Nielsen Tool & Die Co., Berkly, Mich.

SCRIBERS
Bartusch, A. P. Lockport, N. Y.
* Brown & Sharpe Mfg. Co., Providence, R. I.
Ford Motor Co., Johannsson Div., Dearborn, Mich.
* Lufkin Rule Co., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
* Starrett Co., L. S., Athol, Mass.

SEALS, Oil
American Felt Co., N. Y. C.
Armstrong Cork Co., Lancaster, Pa.
Booth Felt Co., Brooklyn, N. Y.
Chicago Rawhide Mfg. Co., Chicago
Felters Co., Boston
Gits Bros. Mfg. Co., Chicago
Graton & Knight Co., Worcester, Mass.
Johns-Manville, N. Y. C.
National Motor Bearings Co., Oakland, Calif.

SEPARATORS, Centrifugal
Barrett Co., Leon J., Worcester, Mass.
* DeLaval Separator Co., N. Y. C.
* National Acme Co., Cleveland
Ransohoff, Inc., N. Cincinnati
Rochester Engrg. & Centrifugal Corp., Rochester, N. Y.
* Tolhurst Div. of American Machine & Metals Mfg. Corp., East Moline, Ill.

SEPARATORS, Magnetic
Frantz, Inc., S. G., N. Y. C.
Stearns Magnetic Mfg. Co., Milwaukee

SET-UP DEVICES
* Oliver Motorcraft Corp., Chicago
Standard Shop Equipment Co., Philadelphia
* Williams Co., J. H., N. Y. C.

SETS, Rivet
American Swiss File & Tool Co., Elizabeth, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Chicago Pneumatic Tool Co., N. Y. C.
Chicago Rivet & Machine Co., Chicago
* Cleveland Punch & Shear Works Co., Cleveland
Independent Pneu. Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
Kane & Roach, Syracuse, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.

SETTERS, Nut (See TOOLS, Portable)

SETTERS, Stud (See also TOOLS, Portable)
Chicago Pneumatic Tool Co., N. Y. C.
Ingersoll-Rand Co., N. Y. C.
Titan Tool Co., Fairview, Pa.

SHAFTING, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin Inc., Harvey, Ill
Crucible Steel Co. of America, N. Y. C.
Cumberland Steel Co., Cumberland, Md.
Dodge Mfg. Corp., Mishawka, Ind.
* Earle Gear & Mach. Co., Philadelphia
Heppenstall Co., Pittsburgh
International Nickel Co. Inc., N. Y. C.
* Jones & Laughlin Steel Corp., Pittsburgh
Link-Belt Co., Chicago
Monarch Steel Co., Indianapolis, Ind.
* National Tube Co. (Subsidiary U. S. Steel Corp.), Pittsburgh
Philadelphia Steel & Iron Co., Conshohocken, Pa.
Ryerson & Son Inc., Jos. T., Chicago
* Scully Steel Products Co., N. Y. C.
* Union Drawn Steel Div. Republic Steel Co., Massillon, O.
* Wyckoff Drawn Steel Co., Pittsburgh

SHAFTS, Flexible
Dumore Co., Racine, Wis.
* Errington Mech. Lab., Stapleton, N. Y.
* Haskins Co., R. G., Chicago
Jarvis Co., Chas. L., Middletown, Conn.
Mall Tool Co., Chicago
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Stow Mfg. Co., Binghamton, N. Y.
* Strand Co., N. A., Chicago
U. S. Electrical Tool Co., Cincinnati
* Walker-Turner Co., Inc., Plainfield, N. J.
White Dental Mfg. Co., S. S., N. Y. C.

SHAPERS, Horizontal
* American Tool Works Co., Cincinnati
* Ames Co., B. C., Waltham, Mass.
Atkins & Co., E. C., Indianapolis
Atlas Press Co., Kalamazoo, Mich.
Automotive Maintenance Machinery Co., N. Chicago, Ill.
* Bryant Machinery & Engrg. Co., Chicago
* Cincinnati Shaper Co., Cincinnati
Cochrane-Bly Co., Rochester, N. Y.
Columbia Machine Tool Co., Hamilton, Ohio
Gould & Eberhardt, Irvington, N. J.
* Hanson-Whitney Mach. Co., Hartford, Conn.
* Hendey Machine Co., Torrington, Conn.
Indian White Eagle Engrg. & Machine Works, Brooklyn, N. Y.
* Lewis Machine Tool Co., Los Angeles
* Machinery Mfg. Co., Los Angeles
Mesta Machine Co., Pittsburgh, Pa.
Morton Mfg. Co., Muskegon Hts., Mich.
* Ohio Machine Tool Co., Kenton, O.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Reed-Prentice Corp., Worcester, Mass.
* Rockford Mach. Tool Co., Rockford, Ill.
* Smith & Mills Co., Cincinnati
Western Mach. Tool Wks., Holland, Mich.

SHAPERS, Vertical
* Ames Co., B. C., Waltham, Mass.
Cochrane-Bly Co., Rochester, N. Y.
Columbia Machine Tool Co., Hamilton, O.
* Hanson-Whitney Mach. Co., Hartford, Conn.
Indian White Eagle Engrg. & Machine Works, Brooklyn, N. Y.
Jones Machine Tool Wks., Inc., Philadelphia
* Machinery Mfg. Co., Los Angeles
* Marburg Bros., Inc., N. Y. C.
Nixon Gear & Mach. Co., Syracuse, N. Y.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rhodes Mfg. Co., Waltham, Mass.
* Rockford Mach. Tool Co., Rockford, Ill.

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CRANK SHAPERS
sizes 12" to 32" stroke
THE SMITH & MILLS CO. Cincinnati, Ohio

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SHARPENERS, Saw
Wardwell Mfg. Co., Cleveland
Mead Specialties Co., Chicago
Detroit Tap & Tool Co., Detroit
* Ex-Cell-O Corp., Detroit
* Fellows Gear Shaper Co., Springfield, Vt.
Gorham Tool Co., Detroit
Michigan Tool Co., Detroit
National Broach & Machine Co., Detroit

SHAVING MACHINES
* Consolidated Machine Tool Corp., Rochester, N. Y.
Cross Gear & Machine Co., Detroit
Michigan Tool Co., Detroit

SHEARS, Hand
* Black & Decker Mfg. Co., Towson, Md.
* Buffalo Forge Co., Buffalo, N. Y.
Canton Fdry. & Mach. Co., Cleveland
Champion Blower & Forge Co., Lancaster, Pa.
Crescent Tool Co., Jamestown, N. Y.
Hanna Engrg. Works, Chicago
Hendley & Whittemore Co., Beloit, Wis.
Mesta Machine Co., Pittsburgh
* Niagara Mach. & Tool Wks., Buffalo, N. Y.
* O'Neil-Irwin Mfg. Co., Minneapolis
Peck, Stow & Wilcox Co., Southington, Mass.
Service Machine Co., Elizabeth, N. J.
Van Dorn Elec. Tool Co., Towson, Md.
Whitney Metal Tool Co., Rockford, Ill.
Wiss & Sons Co., J., Newark, N. J.

SHEARS, Rotary
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Bliss Co., E. W., Brooklyn, N. Y.
* Cleveland Punch & Shear Works Co., Cleveland, O.
* Consolidated Machine Tool Corp., Rochester, N. Y.
Detroit Tap & Tool Co., Detroit
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
Illinois Tool Works, Chicago
Kane & Roach, Inc., Syracuse, N. Y.
Mesta Machine Co., Pittsburgh
Michigan Tool Co., Detroit
* Niagara Mach. & Tool Wks., Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork-Whiting Corp., Harvey, Ill.
Ryerson & Son, Inc., Jos. T., Chicago
* Schatz Mfg. Co., Poughkeepsie, N. Y.
United Engrg. & Fdry. Co., Pittsburgh
Williams, White & Co., Moline, Ill.

SHEARS, Squaring
Beatty Mach. & Mfg. Co., Hammond, Ind.
Bliss Co., E. W., Brooklyn, N. Y.
* Cincinnati Shaper Co., Cincinnati
* Cleveland Punch & Shear Works Co., Cleveland, O.
Columbia Machine Tool Co., Hamilton, O.
* Consolidated Machine Tool Corp., Rochester, N. Y.
Dodge Mfg. Corp., Mishawaka, Ind.
Kent-Owens Machine Co., Toledo, O.
Mesta Machine Co., Pittsburgh
* Mitts & Merrill, Saginaw, Mich.
* Niagara Mach. & Tool Wks., Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Henry, N. Y. C.
* Schatz Mfg. Co., Poughkeepsie, N. Y.
United Engrg. & Fdry. Co., Pittsburgh

SHEAVES, "V" Belt
Allis-Chalmers Mfg. Co., Milwaukee
American Pulley Co., Philadelphia
Boston Gear Works, N. Quincy, Mass.
Dayton Rubber Mfg. Co., Dayton, O.
Dodge Mfg. Corp., Mishawaka, Ind.
* Earle Gear & Machine Co., Philadelphia
Foote Gear Works, Inc., Cicero, Ill.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Hanson Clutch & Mach. Co., Tiffin, O.
* Hill-Acme Co., Cleveland
Medart Co., St. Louis
Mesta Machine Co., Pittsburgh
Miller & Co., Carl A., N. Y. C.
National-Erie Corp., Erie, Pa.
Rockwood Mfg. Co., Indianapolis
Stephens-Adamson Mfg. Co., Aurora, Ill.
Worthington Pump & Machinery Corp., Harrison, N. J.

SHEET-METAL WORKING MACHINERY (See BRAKES, Bending Press; DIES, Sheet-Metal; FORMING Machines; NIBBLERS; PRESSES; REELS, Stripstock; RIVETERS; ROLLS, Bending; SHEARS; STITCHERS, Metal)
Ams Machine Co., Max, Bridgeport, Conn.
Berger Bros. Co., Philadelphia
Bertsch & Co., Cambridge City, Mass.
Bliss Co., E. W., New York
Budd Mfg. Co., Edw. G., Philadelphia
Burritt & Bros., O. W., Weedsport, N. Y.
Campbell, Andrew C., Div. Amer. Chain & Cable Co., Inc., Bridgeport, Conn.
Cameron Can Machinery Co., Chicago, Ill.
Canton Fdry. & Machine Corp., Cleveland, O.
Chambersburg Engrg. Co., Chambersburg, Pa.
* Clearing Machine Corp., Chicago
Conran, Frederick M., Newark, N. J.
Danzer Metal Wks. Co., Hagerstown, Md.
Dreis & Krump Mfg. Co., Chicago
Engineering & Research Corp., Washington, D. C.
* Etna Machine Co., Toledo, Ohio
Excelsior Tool & Machine Co., E. St. Louis, Mo.
* Farrel-Birmingham Co., Inc., Ansonia, Conn.
Ferracute Mach. Co., E. Brighton, N. J.
G. D. S. Machy. & Supply Co., Inc., N. Y. C.
Hallden Machine Co., Thomaston, Conn.
Helwig Mfg. Co., St. Paul, Minn.
* Henry & Wright Mfg. Co., Hartford, Conn.
Hilyard Co., The, Norristown, Pa.
Imperial Tool & Mach. Co., Indianapolis
Ingels Elbow Machine Corp., Chicago, Ill.
Kane & Roach, Inc., Syracuse, N. Y.
Lake Erie Engrg. Corp., Buffalo, N. Y.
Lewis Fdry. & Machine Co., Div. of Blaw-Knox Co., Pittsburgh
McKay Machine Co., Youngstown, Ohio
McKinney Tool & Mfg. Co., Cleveland
Magee Sheet Metal Machy. Co., Ypsilanti, Mich.
Marshalltown Mfg. Co., Marshalltown, Iowa
Mechanical Handling Systems, Inc., Detroit
* Moore Machinery Co., San Francisco
Moyer, J. N., Philadelphia
New Albany Mach. Mfg. Co., New Albany, Ind.
* Niagara Mach. & Tool Works, Buffalo, N. Y.
Nichols, L. O., Kansas City, Mo.
Ohl & Co., Geo. A., Newark, N. J.
Peck, Stow & Wilcox Co., Southington, Conn.
Pellow Machine Co., Detroit
Pels & Co., Henry, N. Y. C.
Perkins Machine Co., Warren, Mass.
Quickwork Co., Chicago
Rafter Machine Co., Belleville, N. J.
Ryerson & Son, Inc., Jos. T., Chicago
Savage Co., W. J., Knoxville, Tenn.
* Schatz Mfg. Co., Poughkeepsie, N. Y.
Service Machine Co., Elizabeth, N. J.
Shuster Co., F. B., New Haven, Conn.
Standard Mach. Co., Providence, R. I.
Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
Steelweld Machinery Co., Cleveland
Stolp Co., Inc., Geneva, N. Y.
Streine Tool & Mfg. Co., New Bremen, Ohio
Thomas Machine Mfg. Co., Pittsburgh
Tishken Products, Detroit
Toledo Mach. & Tool Co., Toledo
* Torrington Mfg. Co., Torrington, Conn.
* V. & O. Press Co., Hudson, N. Y.
Verdin, Kappes & Verdin Co., Cincinnati
Verson Allsteel Press Co., Chicago
Whiting Co., Geo., Chicago
Whitney Metal Tool Co. ,Rockford, Ill.
Williams, White & Co., Moline, Ill.
Yoder Co., Cleveland
Zeh & Hahnemann Co., Newark, N. J.

SHELL-MAKING Machinery
Lake Erie Engrg. Corp., Buffalo, N. Y.
LeMaire Tool & Mfg. Co., Dearborn, Mich.
Prescott Co. Menominee, Mich.
* Sparks Machine Tool Corp., Norwalk, Conn.

SHIFTERS, Belt
Bond Fdry. & Mach. Co., Manheim, Pa.
Diamond Machine Co., Providence, R. I.
Dodge Mfg. Corp., Mishawaka, Ind.
Falls Clutch & Machinery Co., Cuyahoga Falls, O.
* Hill-Acme Co., Cleveland
Howell & Co., R R., Minneapolis
Medart Co., St. Louis
* Ready Tool Co., Bridgeport, Conn.
Reznor Mfg. Co., Mercer, Pa.
Robertson Machine & Foundry Co., W., Buffalo, N. Y.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
* S. K. F. Industries, Inc., Philadelphia
Wood's Sons Co., T. B., Chambersburg, Pa.

SHIMS, Bearing, Plain & Laminated
Akron Metallic Gasket Co., Akron, O.
Laminated Shim Co., L. I. City, N. Y.
National Motor Bearing Co., Oakland, Calif.
Victor Mfg. & Gasket Co., Chicago

SHIPPING SERVICE
* Railway Express Agency, All Principal Cities.

SHOWERS, Shop
Bradley Washfountain Co., Milwaukee
Crane Co. Chicago
Standard Sanitary Corp., N. Y. C.
Weis Mfg. Co., Inc., Henry, Elkhart, Ind.

SKIDS (See **TRUCKS, Hand**)

SLEEVES & SOCKETS, Drill
* Cleveland Twist Drill Co., Cleveland
Greenfield Tap & Die Corp., Greenfield, Mass.
Hardinge Brothers, Inc., Elmira, N. Y.
Morrison Machine Prod. Div., Elmira, N. Y.
Morse Twist Drill & Mach Co., New Bedford, Mass.
* National Twist Drill & Tool Co., Detroit
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
* Scully-Jones & Co., Chicago
Standard Tool Co., Cleveland
* Union Twist Drill Co., Athol, Mass.
Whitman & Barnes, Detroit

SLOTTERS
* Baker Bros., Inc., Toledo, O.
Cochrane-Bly Co., Rochester, N. Y.
* Consolidated Machine Tool Corp., Rochester, N. Y.
* Douglas Machinery Co., Inc., N. Y. C.

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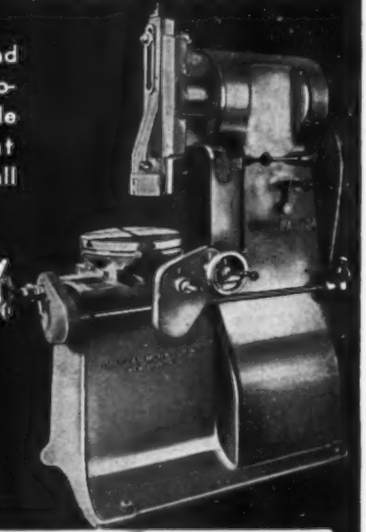

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SLOTTERS (Cont.)
* General Machinery Corp. (Niles Tool Wks. Div.), Hamilton, O.
Greenfield Tap & Die Corp., Greenfield, Mass.
Lindgren & Son Mfg. Co., Bridgeport, Conn.
Morton Mfg. Co., Muskegon Hts., Mich.
Rhodes Mfg. Co., Waltham, Mass.
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.

SOAPS, Germicidal
Sugar Beet Products Co., Saginaw, Mich.

SOCKETS, Drill (See **SLEEVES & SOCKETS, Drill**)

SOLDER
American Smelting & Refining Co., N. Y. C.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Bohm Aluminum & Brass Corp., Detroit
Cambridge Smelting Co., Cambridge, Mass.
Columbia Smelting & Refining Works, Brooklyn, N. Y.
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
Eagle-Picher Lead Co., Cincinnati
Eutectic Welding Alloys, Inc., N. Y. C.
Gardiner Metal Co., Chicago
Glaser Lead Co., Brooklyn, N. Y.
Kester Solder Co., Chicago
Michigan Smelting & Refining Co., Detroit
National Bearing Metals Corp., St. Louis
National Lead Co., N. Y. C.
Philadelphia Solder Co., Philadelphia
Ruby Chemical Co., Columbus, Ohio
U. S. Smelting Works, Philadelphia

SOLVENTS, Oil & Grease
Blakeslee & Co., G. S., Chicago
Creative Chemical Co., Pittsburgh
Detroit Rex Products Co., Detroit
* Oakite Products, Inc., N. Y. C.

SPINDLES, Machine
American Hollow Boring Co., Erie, Pa.
* Bryant Chucking Grinder Co., Springfield, Vt.
Dumore Co., Racine, Wis.
* Ex-Cell-O Corp., Detroit
* Heald Machine Co., Worcester Mass.
* Monarch Machine Tool Co., Sidney, O.
* Pope Machinery Corp., Haverhill, Mass.
* Rivett Lathe & Grinder, Inc., Boston
* Scully-Jones & Co., Chicago
Standard Elec. Tool Co., Cincinnati

SPRAYERS, Metal
Master Metal Spray Co., Oakland, Calif.
Metallizing Co. of America, Los Angeles
Metallizing Engrg. Co., N. Y. C.
Metals Coating Co. of Amer., Philadelphia
Metalspray Co., Los Angeles
Schori Process Corp., L. I. City, N. Y.
Turner Brass Works, Sycamore, Ill.

SPRAYERS, Paint
Beach Air Brush Co., Willard C., Harrison, N. J.
Binks Mfg. Co., Chicago
Breuer Electric Mfg. Co., Chicago
Clements Mfg. Co., Chicago
Crown Spray Gun Mfg. Co., Los Angeles
Curtis Pneumatic Machy. Co., St. Louis
Dayton Pump & Mfg. Co., Dayton, O.
DeVilbiss Co., Toledo, O.
Eclipse Air Brush Co., Inc., Newark, N. J.
Electric Sprayit Co., Milwaukee
Essick Machinery Co., Los Angeles
* Hobart Bros. Co., Troy, O.
Hudson, H. D., Mfg. Co., Chicago
Ideal Commutator Dresser Co., Sycamore, Ill.
Imperial Brass Mfg. Co., Chicago
Kellogg Div., Am. Brake Shoe & Fdry. Co., Rochester, N. Y.
Metal Specialties Mfg. Co., Chicago
Milburn, Alexander, Co., Baltimore
Paasche Airbrush Co., Chicago
Saylor-Beall Mfg. Co., Detroit
Scaife & Sons Co., Wm. B., Oakmont, Pa.
Simons Paint Spray Brush Co., Dayton, O.
Simplex Spray Equipt. Co., Chicago
Smith & Co., Inc., D. B., Utica, N. Y.
Spray Engrg. Co., Somerville, Mass.
U. S. Air Compressor Co., Cleveland

SPRING-COILING & FORMING MACHINES
Baird Machine Co., Bridgeport, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

SPRING TESTERS
American Mach. & Metals, Inc., N. Y. C.
Instrument Spec. Co., Little Falls, N. J.
Link Engrg. & Mfg. Co., Detroit

SPRINGS, Coil
American Spiral Spring & Mfg. Co., Pittsburgh
American Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co., Cleveland
Barnes Co., Wallace, Div. of Associated Spring Corp., Bristol, Conn.
Chicago Coil Spring Co., Chicago
Cleveland Wire Spring Co., Cleveland
Crucible Steel Co. of America, N. Y. C.
Cuyahoga Spring Co., Cleveland
Hunter Pressed Steel Co., Lansdale, Pa.
Peck Spring Co., Plainville, Conn.
Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.
Wickwire-Spencer Steel Co., N. Y. C.

SPRINGS, Die
* Allen Mfg. Co., Hartford, Conn.
* Danly Machine Specialties, Chicago
U. S. Tool Co., Ampere, N. J.

SPROCKETS (See **GEARS, Cut**)

SQUARES, Precision (See **BLOCKS, Precision Gage**)

STAMPINGS, Metal
Acromark Corp., Elizabeth, N. J.
Aluminum Goods Mfg. Co., Manitowoc, Wis.
American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
* Continental Machines, Inc., Minneapolis
Dahlstrom Metallic Door Co., Jamestown, N. Y.
* Dayton Rogers Mfg. Co., Minneapolis
Grand Haven Stamped Products, Grand Haven, Mich.
Laminated Shim Co., Inc., Long Island City, N. Y.
Metalcraft Mfg. Corp., H. K., N. Y. C.
Murray Mfg. Co., D. J., Wausau, Wis.
Palmer-Bee Co, Detroit
Powell Pressed Steel Co., Hubbard, O.
Revere Copper & Brass Inc., N. Y. C.
Scovill Mfg. Co., Waterbury, Conn.
Seamless Prod. Co., Inc., N. Y. C.
* Standard Pressed Steel Co., Jenkintown, Pa.
* Sundstrand Mach. Tool Co., Rockford, Ill.
Transue & Williams, Alliance, O.
Worcester Pressed Steel Co., Worcester, Mass.

STAMPS & HOLDERS, Steel, Safety
Acromark Corp., Elizabeth, N. J.
* Cunningham Co., M. E. Pittsburgh
New Method Steel Stamp, Inc., Detroit
* Noble & Westbrook Mfg. Co., East Hartford, Conn.

STAMPS, Steel (See **DIES, Marking & Embossing**)

STARTERS, Motor (See **CONTROLLERS, Motor**)

STEEL, Die
* Allegheny Ludlum Steel Corp., Pittsburgh
Anchor Drawn Steel Co., Pittsburgh
Bethlehem Steel Co., Bethlehem, Pa.
Carpenter Steel Co., Reading, Pa.
* Cleveland Twist Drill Co., Cleveland
Colonial Steel Co., Pittsburgh
Columbia Tool Steel Co., Chicago Hts., Ill.
Crucible Steel Co. of America, N. Y. C.
Driver-Harris Co., Harrison, N. J.
Finkl & Sons Co., A., Chicago
Firth-Sterling Steel Co., McKeesport, Pa.
Heppenstall Co., Pittsburgh
Jessop Steel Co., Washington, Pa.
* Latrobe Electric Steel Co., Latrobe, Pa.
Milne & Co., A., N. Y. C.
Ryerson & Son, Inc., Jos. T., Chicago
* Timken Steel & Tube, Div. of Timken Roller Bearing Co., Canton, O.
Universal Steel Co., Bridgeville, Pa.
* Vanadium Alloys Steel Co., Pittsburgh

STEEL-MILL PRODUCTS
Acme Steel Co., Chicago (Hot- and cold-rolled strip steel and strip stainless steel)
Advance Foundry Co., Dayton, O.
* Allegheny-Ludlum Steel Corp., Pittsburgh, (Steel and stainless steel sheets, plates, tubes, wire and strip)
American Rolling Mill Co., Middletown, Ohio (Iron, steel and stainless steel sheets, plate, strip and coils and spiral welded pipe)
American Steel & Tin Plate Co., Pittsburgh
* American Steel & Wire Co., Cleveland (Cold-finished bars, wire and wire products)
Anchor Drawn Steel Co., Pittsburgh
Bethlehem Steel Co., Bethlehem, Pa.
* Bissett Steel Co., Cleveland (Tubing)
Bliss & Laughlin, Inc., Harvey, Ill. (Cold-finished bars, shafting, screw stock)
* Boker & Co. Inc., H., N. Y. C.
Buffalo Bolt Co., North Tonawanda, N. Y. (Merchant and hot-rolled bars, hot-rolled coiled flats, wire)
Byers, A. M., Co., Pittsburgh (Plates, sheets, billets, bar iron, pipe, etc.)
* Carnegie-Illinois Steel Corp., Pittsburgh
Carpenter Steel Co., Reading, Pa.
Chemical Foundation, Inc., N. Y. C.
Colonial Steel Co., Pittsburgh
* Columbia Steel Co. (Subsidiary U. S. Steel), San Francisco
Columbia Tool Steel Co., Chicago Hts., Ill.
Copperweld Steel Co., Glassport, Pa.
Crucible Steel Co. of America, N. Y. C.
* Disston, Henry, & Sons, Inc., Tacony, Philadelphia
Edwards Mfg. Co., Cincinnati, O. (Iron and steel corrugated and stainless steel sheets, etc.)
Firth-Sterling Steel Co., McKeesport, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
Heller Brothers Co., Newark, N. J.
Highland Iron & Steel Co., Terre Haute, Ind.
* Ingersoll Steel & Disc, Div. Borg-Warner Corp., New Castle, Ind.
Inland Steel Co., Chicago, Ill. (Sheets strip, tin-mill and bar-mill products, plates, shapes, rail steel, etc.)
Jessop Steel Co., Washington, Pa. (stainless)
* Jones & Laughlin Steel Corp., Pittsburgh
Kidd Drawn Steel Co., Aliquippa, Pa. (Key steel [Woodruff] and special shapes)
Kroydon Co., Maplewood, N. J. (Seamless Tubing, etc.)
LaSalle Steel Co., Chicago (Shafting and cold-finish bar)
* Latrobe Elec. Steel Co., Latrobe, Pa.
Lyon Conklin & Co., Inc., Baltimore, Md. (Sheet metal)
Milne & Co., A., N. Y. C.
Monarch Steel Co., Indianapolis
O'Leary, Arthur J., & Son Co., Chicago
Philadelphia Steel & Wire Corp., Philadelphia
Pittsburgh Steel Co., Pittsburgh
Pittsburgh Tool Steel Wire Co., Monaca, Pa. (Cold-drawn steel—alloy, tool, high-speed and special shapes)
Prosser & Sons, Thos., N. Y. C.
* Republic Steel Corp., Cleveland
Roper, Geo. D., Corp., Rockford, Ill.
Rustless Iron & Steel Corp., Baltimore, Md.
Ryerson, & Son Co., Jos. T., Chicago
Sandvik Steel, Inc., N. Y. C. (Hot-rolled bars, bands and tubing, cold-rolled bars and strip, cold-drawn bars and tubing)
* Scully Steel Products Co. (Subsidiary U. S. Steel Corp.), N. Y. C.
Simonds Saw and Steel Co., Fitchburg, Mass. (Flat ground stock)
Sheffield Steel Corp., Kansas City, Mo. (Blue annealed sheets, ingots, blooms, billets, plates, etc.)
* Timken Steel & tube, Div. Timken Roller Bearing Co., Canton, O.
* Union Drawn Steel Div., Republic Steel Corp., Massillon, O. (Cold-finished)
Universal Steel Co., Bridgeville, Pa.
* Vanadium Alloys Steel Co., Pittsburgh
Wheeling Corrugating Co., Wheeling, W. Va. (Sheet-steel products, wire and wire products, roofing, etc.)
Wheeling Steel Corp., Wheeling, W. Va. (Sheet steel, wire and wire products, pipe, roofing, etc.)
Worcester Pressed Steel Co., Worcester, Mass.
* Wyckoff Drawn Steel Co., Pittsburgh
Youngstown Sheet & Tube Co., Youngstown, O.

STEEL, Stainless (See preceding classification)

STEEL, Tool
Advance Foundry Co., Dayton, O.
* Allegheny-Ludlum Steel Corp., Pittsburgh
Anchor Drawn Steel Co., Pittsburgh
Bethlehem Steel Co., Bethlehem, Pa.
* Carnegie-Illinois Steel Corp., Subsidiary U. S. Steel Corp., Pittsburgh
Carpenter Steel Co., Reading, Pa.
* Cleveland Twist Drill Co., Momax Div., Cleveland
Climax Molybdenum Co., N. Y. C.
Colonial Steel Co., Pittsburgh
* Columbia Steel Co., Subsidiary U. S. Steel Corp., San Francisco, Calif.
Columbia Tool Steel Co., Chicago Heights, Ill.
Copperweld Steel Co., Glassport, Pa.
Crucible Steel Co. of America, N. Y. C.
Firth-Sterling Steel Co., McKeesport, Pa.
Foote Bros. Gear & Machine Co., Chicago
Gorham Tool Co., Detroit
Heppenstall Co., Pittsburgh
* Ingersoll Steel & Disc, Div. Borg-Warner Corp., Newcastle, Ind.
Jessop Steel Co., Washington, Pa.
* Latrobe Electric Steel Co., Latrobe, Pa.
Milne & Co., A., N. Y. C.
Prosser & Son, Thos., N. Y. C.
* Republic Steel Corp., Cleveland, O.
Ryerson & Son, Inc., Jos. T., Chicago
* Scully Steel Products Co., N. Y. C.
* Timken Steel & Tube, Div. Timken Roller Bearing Co., Canton, O.
* United States Steel Corp., Pittsburgh
Universal Steel Co., Bridgeville, Pa.
* Vanadium Alloys Steel Co., Pittsburgh
Verdin, Koppes, Verdin Co., Cincinnati

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For marking around circumference of Bars, Tubes, Shell Forgings and other Round Pieces.

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Safety Steel Construction eliminates spalling and mushrooming.

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STITCHERS, Metal
Bostitch, Inc., E. Greenwich, R. I.
Harris-Seybold-Potter Co., Dayton, O.
Quickwork-Whiting Corp., Harvey, Ill.

STOCKS, Dies & Cutters, Pipe
* Armstrong Bros. Tool Co., Chicago
Beaver Pipe Tools Inc., Warren, O.
* Butterfield Div. Union Twist Drill Co., Derby Line, Vt.
* Card Mfg. Co., S. W., Mansfield, Mass.
Crane Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Oster Mfg. Co., Cleveland
Peters Tool Co., Milwaukee
* Pratt & Whitney Co., Div. Niles-Bement-Pond Co., Hartford, Conn.
Ridge Tool Co., Elyria, Ohio
* Sheffield Corp. Gage Div., Dayton, O.
Standard Tool Co., Cleveland
Toledo Pipe Threading Machine Co., Toledo, O.
Wells Tool Co., Greenfield, Mass.
* Winter Bros. Co., Wrentham, Mass.

STONES, Sharpening
Abrasive Co., Philadelphia
Bay State Abrastive Products Co., Westboro, Mass.
Behr-Manning Corp., Troy, N. Y.
* Carborundum Co., Niagara Falls, N. Y.
Norton Company, Worcester, Mass.

STRAIGHTEDGES (See **DIE-MAKERS' SUPPLIES**)

STRAIGHTENERS, Wire
Chambersburg Engrg. Co., Chambersburg, Pa.
* Cleveland Punch & Shear Works Co., Cleveland
* Consolidated Machine Tool Corp., Rochester, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Shuster Co., F. B., New Haven, Conn.
* Springfield Mach. Tool Co., Springfield, O.
U. S. Tool Co., Inc., Ampere, N. J.
Waterbury Farrel Foundry & Mach. Co., Waterbury, Conn.
* Watson-Stillman Co., Roselle, N. J.

STRAIGHTENING & SIZING MACHINES
Taylor Wilson Mfg. Co., McKees Rocks, Pa.

STRIPPERS, Wire
Artos Engrg. Co., Milwaukee
Carlander, Henry, N. Y. C.
France Mfg. Co., Cleveland
Globe Tool & Engrg. Co., Dayton, O.
Ideal Commutator Dresser Co., Sycamore, Ill.
Midwestern Tool Co., Chicago
Novelty Electric Co., Philadelphia
Pyramid Products Co., Chicago
Wire Stripper Co., Cleveland

STUDS
Bethlehem Steel Co., Bethlehem, Pa.
Billings & Spencer Co., Hartford, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Clark Bros. Bolt Co., Millidale, Conn.
Harper Co., H. M., Chicago
Lamson & Sessions Co., Cleveland
* National Acme Co., Cleveland
* Parker-Kalon Corp., N. Y. C.
Pheoll Mfg. Co., Chicago
* Republic Steel Corp., Cleveland
* Strong, Carlisle & Hammond Co., Cleveland

SUB-PRESSES & DIES (See **Dies, Subpress**)

SUPERFINISHING EQUIPMENT
Foster Machine Co., Elkhart, Ind.
Ohio Units, Dayton, O.

SURFACE-BROACHING MACHINES (See **BROACHING MACHINES**)

SURFACE PLATES (See **PLATES, Surface**)

SWAGING MACHINES
* Etna Machine Co., Toledo
Hardinge Brothers, Inc., Elmira, N. Y.
Langelier Mfg. Co., Providence, R. I.
* Torrington Co., Torrington, Conn.
Waterbury Farrel Foundry & Mach. Co., Waterbury, Conn.

SWITCHES, Electric
Adam Electric Co., Frank, St. Louis
Allen-Bradley Co., Milwaukee
Allis-Chalmers Mfg. Co., Milwaukee
* Barber-Colman Co., Rockford, Ill.
Bristol Co., Waterbury, Conn.
* Brown Instrument Co., Philadelphia
Clark Controller Co., Cleveland
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Cutler-Hammer, Inc., Milwaukee
Electric Controller & Mfg. Co., Cleveland
Euclid Electric & Mfg. Co., Euclid, O.
General Controls Co., San Francisco
* General Electric Co., Schenectady, N. Y.
Leeds Electric & Mfg. Co., Hartford, Conn.
McDonnell & Miller, Chicago
Micro Switch Corp., Freeport, Ill.
Monitor Controller Co., Baltimore, Md.
Signal Engrg. & Mfg. Co., N. Y. C.
Square D Co., Milwaukee
Struthers Dunn, Inc., Philadelphia
Tork Clock Co., Inc., Mt. Vernon, N. Y.
Trumbull Elec. Mfg. Co., Plainville, Conn.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
* Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

SWITCHES, Limit
Adam Electric Co., Frank, St. Louis
Allen-Bradley Co., Milwaukee
* Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland
Cutler-Hammer, Inc., Milwaukee
Electric Controller & Mfg. Co., Cleveland
Euclid Electric & Mfg. Co., Euclid, O.
* General Electric Co., Schenectady, N. Y.
Jefferson Electric Co., Bellwood, Ill.
Micro Switch Corp., Freeport, Ill.
Monitor Controller Co., Baltimore, Md.
* National Acme Co., Cleveland
Partlow Corp., New Hartford, N. Y.
Photo Switch, Inc., Cambridge, Mass.
Production Instrument Co., Chicago
Spencer Thermostat Co., Attleboro, Mass.
Square D Co., Milwaukee
Struthers Dunn, Inc., Philadelphia
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
* Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

SWITCHES, Mercury
Acme Electric Heating Co., Boston
* Brown Instrument Co., Philadelphia
Center & Giveen Co., Berkeley, Calif.
Durakool, Inc., Elkhart, Ind.
General Electric Co., Bridgeport, Conn.
McDonnell & Miller, Chicago
Minneapolis-Honeywell Regulator Co., Minneapolis
Powrex Switch Co., Waltham, Mass.
Tork Clock Co., Inc., Mt. Vernon, N. Y.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
* Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

SYSTEMS, Production & Tool Control
McCaskey Register Co., Alliance, O.
Remington Rand, Inc., Buffalo, N. Y.

TACHOMETERS (See **INDICATORS, Speed**)

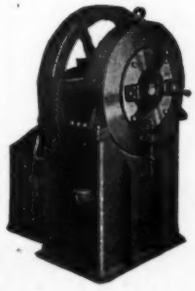
TANKS & CYLINDERS, Air
Anker Holth Mfg. Co., Port Huron, Mich.
Binks Mfg. Co., Chicago
Bliss Co., E. W., Brooklyn, N. Y.
Chicago Pneumatic Tool Co., N. Y. C.
* Clearing Machine Corp., Chicago
Curtis Pneu. Machinery Co., St. Louis
Hanna Engrg. Works, Chicago
Hannifin Mfg. Co., Chicago
Ingersoll-Rand Co., N. Y. C.
LeMaire Tool & Mfg. Co., Dearborn, Mich.
Logansport Machine, Inc., Logansport, Ind.
* National Tube Co., Pittsburgh
Northern Engrg. Works, Detroit
Seamless Steel Equipt. Corp., N. Y. C.
Skinner Chuck Co., New Britain, Conn.
Sullivan Mach. Co., Michigan City, Ind.
* Tomkins-Johnson Co., Jackson, Mich.

TANKS, Quenching
* American Gas Furnace Co., Elizabeth, N. J.
Koven & Bros., Inc., L. O., Jersey City, N. J.
* Strong, Carlisle & Hammond Mach. Co., Cleveland

TAPER PINS (See **PINS, Dowel & Taper**)

TAPES, Measuring
Chicago Steel Tape Co., Chicago
Dietzgen Co., Eugene, Chicago
Keuffel & Esser Co., Hoboken, N. J.
* Lufkin Rule Co., Saginaw, Mich.
* Starrett Co., L. S., Athol, Mass.

TAPPERS, Single & Multi-Spindle
Allen Co., Chas. G., Barre, Mass.
* Armstrong-Blum Mfg. Co., Chicago
Atlas Press Co., Kalamazoo, Mich.
* Avey Drilling Machine Co., Cincinnati
* Baker Bros., Inc., Toledo, O.
* Barnes Drill Co., Rockford, Ill.
* Barnes Co., W. F. & John, Rockford, Ill.
Baush Machine Tool Co., Springfield, Mass.
* Bodine Corp., Bridgeport, Conn.
Bradford Mach. Tool Co., Cincinnati
* Buffalo Forge Co., Buffalo, N. Y.
Buhr Mach. Tool Co., Ann Arbor, Mich.
* Cincinnati Bickford Tool Co., Oakley, Cincinnati
* Cincinnati-Gilbert Machine Tool Co., Cincinnati
Cosa Oversea Trading Corp., N. Y. C.
Defiance Machine Works, Defiance, O.
Delta Mfg. Co., Milwaukee
* Etteo Tool Co., Brooklyn, N. Y.
* Foote-Burt Co., Cleveland
Frew Machine Co., Philadelphia
* Geometric Tool Co., New Haven, Conn.
* Goss & deLeeuw Machine Co., New Britain, Conn.
Greenlee Bros. & Co., Rockford, Ill.
* Hamilton Tool Co., Hamilton, O.
* Haskins Co., R. G., Chicago
* Hill-Acme Co., Cleveland
Hoefer Mfg. Co., Freeport, Ill.



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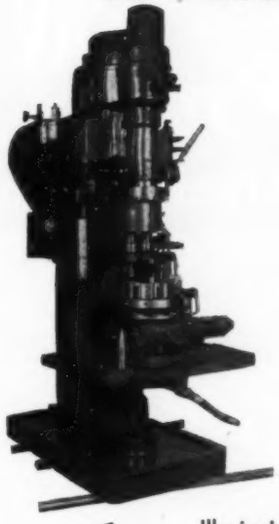

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- Increase your Screw Machine Capacity

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Ingersoll Milling Mach. Co., Rockford, Ill.
Jarvis, Chas. L., Middletown, Conn.
* Kaufman Mfg. Co., L. J., Manitowac, Wis.
* Kingsbury Mach. Tool Corp., Keene, N. H.
Langelier Mfg. Co., Providence, R. I.
* Leland-Gifford Co., Worcester, Mass.
Mall Tool Co., Chicago
* Moline Tool Co., Moline, Ind.
* Murchey Mach. & Tool Co., Detroit
* National Acme Co., Cleveland
National Auto. Tool Co., Richmond, Ind.
* National Machinery Co., Tiffin, O.
Procunier Safety Chuck Co., Chicago
* Rickert-Shafer Co., Erie, Pa.
Rockford Drilling Machine, Div. Borg-Warner Corp., Rockford, Ill.
* Snyder Tool & Engrg. Co., Detroit
Stamets, Wm. K., Pittsburgh, Pa.
Western Mach. Tool Wks., Holland, Mich.

TAPS, Adjustable (See **DIES, Adjustable**)

TAPS, Hand & Machine, Solid
Alvord-Polk Tool Co., Millersburg, Pa.
American Screw Co., Providence, R. I. (Machine-screw)
Armstrong Mfg. Co., Bridgeport, Conn.
Bath & Co., Inc., John, Worcester, Mass.
Bay State Tap & Die Co., Mansfield, Mass.
Besley & Co., Charles H., Chicago
* Butterfield & Co., Div. Union Twist Drill Co., Derby Line, Vt.
* Card Mfg. Co., S. W., Mansfield, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
Detroit Tap & Tool Co., Detroit
* Geometric Tool Co., New Haven, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
* Hanson-Whitney Machine Co., Hartford, Conn.
Keystone Reamer & Tool Co., Millersburg, Pa.
Mayhew Steel Products, Inc., Shelburne Falls, Mass.
Michigan Tool Co., Detroit
Morse Twist Drill & Machine Co., New Bedford, Mass.
* Murchey Machine & Tool Co., Detroit
* National Twist Drill & Tool Co., Detroit
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
* Rickert-Shafer Co., Erie, Pa.
Standard Tool Co., Cleveland
Threadwell Tap & Die Co., Greenfield, Mass.
* Union Twist Drill Co., Athol, Mass.
Whitman & Barnes, Detroit
* Winter Brothers Co., Wrentham, Mass.
Wood & Spencer Co., Cleveland

TESTERS, Gear
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Farrel-Birmingham Co., Buffalo, N. Y.
* Fellows Gear Shaper Co., Springfield, Vt.
Gleason Works, Rochester, N. Y.
Illinois Tool Works, Chicago
* Lees-Bradner Co., Cleveland
Michigan Tool Co., Detroit
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Broach & Machine Co., Detroit
Newark Gear Cutting Machine Co., Newark, N. J.
* Scherr Co., Geo., N. Y. C.
Zeiss, Carl, Inc., N. Y. C.

TESTING EQUIPMENT, Tension & Compression
Baldwin-Southwark Corp., Philadelphia
* Hartford Special Machinery Co., Hartford, Conn.
Hydraulic Press. Mfg. Co., Mt. Gilead, O.
Olsen Testing Machine Co., Philadelphia
Riehle Testing Mach., Div. Am. Mach. & Metals Corp., E. Moline, Ill.

THREADING MACHINES, Die-Head
* Dalzen Tool & Mfg. Co., Detroit
* Eastern Mach. Screw Corp., New Haven, Conn.
* Geometric Tool Co., New Haven, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
* Hill-Acme Co., Cleveland
* Lees-Bradner Co., Cleveland
* Murchey Machine & Tool Co., Detroit
* Rickert-Shafer Co., Erie, Pa.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
* Waltham Mach. Wks., Waltham, Mass.

THREADING MACHINES, Roll
* Hill-Acme Co., Cleveland
* V. & O. Press Co., Hudson, N. Y.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

THERMOCOUPLES
* Brown Instrument Co., Philadelphia
Foxboro Co., Foxboro, Mass.
Hoskins Mfg. Co., Detroit
Leeds & Northrup Co., Philadelphia
Taylor Instrument Cos., Rochester, N. Y.
Thwing-Albert Inst. Co., Philadelphia

THERMOMETERS, Dial
American Schaeffer & Budenberg Div. Consolidated Ashcroft Hancock Co., Bridgeport, Conn.
Bristol Co., Waterbury, Conn.
* Brown Instrument Co., Philadelphia
Consolidated Ashcroft Hancock Div., Bridgeport, Conn.
Foxboro Co., Foxboro, Mass.
Illinois Testing Lab., Inc., Chicago
Industrial Instrument Co., Akron, O.
Leeds & Northrup Co., Philadelphia
Marsh Corp., Jas. P., Chicago
Philadelphia Thermometer Co., Philadelphia
Powers Regulator Co., Chicago
Pyrometer Instrument Co., N. Y. C.
Sarco Co., Inc., N. Y. C.
* Strong, Carlisle & Hammond Co., Cleveland
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Cos., Rochester, N. Y.
U. S. Gauge Co., N. Y. C.
Weston Elec. Inst. Corp., Newark, N. J.
Wheelco Instruments Co., Chicago

TIMERS, Production (See also **COUNTERS, Revolution & Stroke**)
Cramer Co., Inc., R. W., Centerbrook, Conn.
* National Acme Co., Cleveland
National Instrument Co., Boston, Mass.
Production Inst. Co., Chicago

TIMERS, Welding
Cramer Co., Inc., R. W., Centerbrook, Mass.
Cutler-Hammer Inc., Milwaukee
Electric Controller & Mfg. Co., Cleveland
* General Electric Co., Schenectady, N. Y.
Square D Co., Milwaukee
Taylor Hall Welding Corp., Worcester, Mass.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
Welding Timer Mfg. Co., Inc., Newark, N. J.
Weltronic Corp., Detroit
* Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

TOOL HOLDERS (See **HOLDERS, Tool**)

TOOL POSTS, Lathe
* Armstrong Bros. Tool Co., Chicago
Colonial Broach Co., Detroit
Detroit Tap & Tool Co., Detroit
Four-Grip Tool Co., aPterson, N. J.
Gerstner Sons, H., Dayton, O.
* Gisholt Machine Co., Madison, Wis.
* Hendey Machine Co., Torrington, Conn.
* McCrosky Tool Corp., Meadville, Pa.
* Michigan Tool Co., Detroit
O. K. Tool Co., Shelton, Conn.
* Pratt & Whitney, Div. Niles-Bement-Pond Co., Hartford, Conn.

TOOLS, Boring
* Armstrong Bros. Tool Co., Chicago
Carboloy Co., Detroit, Mich.
* Cincinnati Lathe & Tool Co., Oakley, Cincinnati
Craley Mfg. Co., C. C., Shillington, Pa.
Davis Boring Tool Co. Div. Larkin Packer Co.), St. Louis
Eclipse Counterbore Co., Detroit
* Ex-Cell-O Corp., Detroit
Flynn Mfg. Co., Detroit
Foster Machine Co., Elkhart, Ind.
Four-Grip Tool Co., Paterson, N. J.
* Gairing Tool Co., Detroit
* Gisholt Machine Co., Madison, Wis.
* Haynes Stellite Co., N. Y. C.
* Heald Machine Co., Worcester, Mass.
Illinois Tool Works, Chicago
Ingersoll Milling Mach. Co., Rockford, Ill.
Kelly Reamer Co., Cleveland
* Lucas Machine Tool Co., Cleveland
* McCrosky Tool Corp., Meadville, Pa.
Michigan Tool Co., Detroit
* National Tool Co., Cleveland
* Pratt & Whitney Co., Div. Niles-Bement-Pond Co., Hartford, Conn.
Prosser & Son, Thos., N. Y. C.
* Ready Tool Co., Bridgeport, Conn.
* Scully-Jones & Co., Chicago
Stoody Co., Whittier, Calif.
Super-Tool Co., Detroit
Taft-Peirce Mfg. Co., Woonsocket, R. I.
* Warner & Swasey Co., Cleveland
Wesson Co., Detroit
Westcott Chuck Co., Oneida, N. Y.
* Williams & Co., J. H., N. Y. C.

TOOLS, Box-Strapping
Acme Steel Co., Chicago
Graton & Knight Co., Worcester, Mass.
Stanley Works, New Britain, Conn.

TOOLS and PARTS, Cemented-Carbide
* Armstrong Bros. Tool Co., Chicago
* Barber-Colman Co., Rockford, Ill.
Carboloy Co., Inc., Detroit
* Carbide Tool Engrg. Co., Chicago
Crafts Co. Inc., Arthur A., Boston
Detroit Tap & Tool Co., Detroit
* Disston and Sons, Inc., Henry, Tacony Philadelphia
Eclipse Counterbore Co., Detroit
* Ex-Cell-O Corp., Detroit
Fansteel Metallurgical Corp., No. Chicago, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
* Gairing Tool Co., Detroit
Illinois Tool Works, Chicago
Ingersoll Milling Mach. Co., Rockford, Ill.
Jessop Steel Co., Washington, Pa.
* McKenna Metals Co., Latrobe, Pa.
Metal Carbides Corp., Youngstown, O.
Michigan Tool Co., Detroit
Midwest Tool & Mfg. Co., Detroit
Morse Twist Drill & Mach. Co., New Bedford, Mass.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Production Tool Co., Detroit
Prosser & Son, Thos., N. Y. C.
* Scully-Jones & Co., Chicago
* Sheffield Corp., Gage Div., Dayton, O.

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Reversible Ratchet Wrench

Profit by the experience of the many plants that have compared Favorite Wrenches with ordinary wrenches and have found that Favorites tighten nuts 75% quicker and make them tighter. Speed up your assembly operations on apparatus and pipe lines by using Favorites — the only socket wrench that accommodates two different sizes of nuts with each head.

Three sizes of handles; each handle takes five different heads; each head fits two different size nuts. Write for circular and prices.

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Tungsten Carbide Tool Co., Detroit
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* Vanadium Alloys Steel Co., Pittsburgh
* Vascoloy-Ramet Corp., Chicago
* Warner & Swasey Co., Cleveland
Wesson Co., Detroit
Willey's Carbide Tool Co., Detroit
* Williams & Co., J. H., Buffalo, N. Y.

TOOLS, Diamond-Tipped
American Manganese Steel Div., Chicago Hgts., Ill.
Bausch & Lomb Optical Co., Rochester, N. Y.
* Crafts Co., Arthur A., Boston
* Diamond Tool Co., Chicago
Driver-Harris Co., Harrison, N. J.
Gilmore & Co., F. F. Boston
* Gorton Machine Co., Geo., Racine, Wis.
Kent-Owens Machine Co., Toledo, O.
* Koebel Diamond Tool Co., Detroit
Mesta Machine Co., Pittsburgh
Micro Instrument Co., Cambridge, Mass.
Norton Company, Worcester, Mass.
Smit & Son, J. K., N. Y. C.
Stark Tool Co., Waltham, Mass.
Super Tool Company, Detroit
Wesson Co., Detroit

TOOLS, Felxible-Shaft
Dumore Co., Racine, Wis.
* Haskins Co., R. G., Chicago
Ideal Commutator Dresser Co., Sycamore, Ill.
Jarvis Co., Charles L., Middletown, Conn.
Mall Tool Co., Chicago
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Stanley Electrical Tool Div., Stanley Works, New Britain, Conn.
Stow Mfg. Co., Binghamton, N. Y.
* Strand & Co., N. A. Chicago
U. S. Electrical Tool Co., Cincinnati
* Walker-Turner, Inc., Plainfield, N. J.
White Dental Mfg. Co., S. S., Philadelphia

TOOLS, Hand
* Allen Mfg. Co., Hartford, Conn.
American Instrument Co. Inc., Silver Spring, Md.
* American Swiss File & Tool Co., Elizabeth, N. J.
Apex Mach. & Tool Co., Dayton, O.
* Armstrong-Blum Mfg. Co., Chicago
* Armstrong Bros. Tool Co., Chicago
Atkins & Co., F. C., Indianapolis
Automotive Maintenance Machy. Co., No. Chicago, Ill.
Barnes Co., W. O., Detroit
Blackhawk Mfg. Co., Milwaukee
Bonney Forge & Tool Works, Allentown, Pa.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Butterfield Div. Union Twist Drill Co., Derby Line, Vt.
* Capewell Mfg. Co., Hartford, Conn.
Carboloy Co., Detroit
* Card Mfg. Co., S. W., Mansfield, Mass.
Chicago Mfg. & Distributing Co., Chicago
Chicago Rawhide Mfg. Co., Chicago
Cincinnati Tool Co., Cincinnati, Ohio
* Cleveland Punch & Shear Works Co., Cleveland
* Cleveland Twist Drill Co., Cleveland
* Crafts Co., Arthur A., Boston
Crescent Tool Co., Jamestown, N. Y.
* Cunningham Co., M. E., Pittsburgh
* Dearborn Gage Co., Dearborn, Mich.
Dickerman Mfg. Co., H. E., Springfield, Mass.
* Disston & Sons, Inc., Henry, Tacony, Philadelphia
Eclipse Counterbore Co., Detroit
Elastic Stop Nut Corp., Union, N. J.
Electric Soldering Iron Co., Inc., Deep River, Conn.
Forsburg Mfg. Co., Bridgeport, Conn.
* Gairing Tool Co., Detroit
Goodrich Co., B. F., Akron, O.
* Greene Tweed & Co., N. Y. C.
Greenfield Tap & Die Corp., Greenfield, Mass.
* Hamilton Tool Co., Hamilton, O.
Knu-Vise Products Co., Detroit
* Lufkin Rule Co., Saginaw, Mich.
Millers Falls Co., Greenfield, Mass.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
* National Twist Drill & Tool Co., Detroit
* Niagara Mach. & Tool Wks., Buffalo, N. Y.
North Bros. Mfg. Co., Philadelphia
Numberall Stamp & Tool Co., Staten Is., N. Y.
Owatonna Tool Co., Owatonna, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Pittsburgh Stencil & Tool Co., Pittsburgh
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
Production Tool Co., Detroit
* Producto Machine Co., Bridgeport, Conn.
* Racine Tool & Mach. Co., Racine, Wis.
* Scully-Jones & Co., Chicago
Service Machine Co., Elizabeth, N. J.
Severance Tool Mfg. Co., Saginaw, Mich.
* Slocomb Co., J. T., Providence, R. I.
Standard Tool Co., Cleveland
Stanley Tools, New Britain, Conn.
Thompson & Son Co., Henry G., New Haven, Conn.
* Union Twist Drill Co., Athol, Mass.
* Victor Saw Works, Inc., Middletown, N. Y.
Wesson Co., Detroit
Whitney Metal Tool Co., Rockford, Ill.
* Williams & Co., J. H., N. Y. C.

TOOLS, Knurling (See **Knurls & Knurl Holders**)

TOOLS, Lathe, Shaper and Planer
* American Tool Works Co., Cincinnati
Apex Tool & Cutter Co., Shelton, Conn.
* Armstrong Bros. Tool Co., Chicago
Atlas Press Co., Kalamazoo, Mich.
Carboloy Co., Detroit
* Cincinnati Lathe & Tool Co., Oakley, Cincinnati
* Cleveland Twist Drill Co., Cleveland
Colonial Broach Co., Detroit
Columbia Tool Steel Co., Chicago
Eclipse Counterbore Co., Detroit
* Empire Tool Co., Detroit
* Ex-Cell-O Corp., Detroit
Fansteel Metallurgical Corp., N. Chicago, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
* Gisholt Machine Co., Madison, Wis.
Gorham Tool Co., Detroit
* Haynes Stellite Co., N. Y. C.
* Hendey Machine Co., Torrington, Conn.
Illinois Tool Works, Chicago
* LeBlond Machine Tool Co., R. K., Cincinnati
* McKenna Metals Corp., Latrobe, Pa.
Michigan Tool Co., Detroit
* Milholland Machinery Co., Indianapolis
National Broach & Machine Co., Detroit
* National Tool Co., Cleveland
O. K. Tool Co., Shelton, Conn.
* Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.
R. & L. Tools, Nicetown, Philadelphia
* Ready Tool Co., Bridgeport, Conn.
* Rivett Lathe & Grinders, Inc., Boston, Mass.
* Scully-Jones & Co., Chicago
Standard Electrical Tool Co., Cincinnati
* Starrett Co., L. S., Athol, Mass.
* Warner & Swasey Co., Cleveland
Wesson Co., Detroit
Western Tool & Mfg. Co., Springfield, O.
* Williams & Co., J. H., N. Y. C.

TOOLS, Portable Electric
Arcade Mfg. Co., Freeport, Ill.
Black & Decker Mfg. Co., Towson, Md.
Chicago Pneumatic Tool Co., N. Y. C.
Chicago Wheel & Mfg. Co., Chicago
Cincinnati Elec. Tool Co., Cincinnati
Clark Electric Co., James, Jr., Louisville, Ky.
Delta Mfg. Co., Milwaukee
Dumore Co., Racine, Wis.
Ferriot Bros., Akron, Ohio
Goodell-Pratt Co., Div. Millers Falls Co., Greenfield, Mass.
* Hisey-Wolf Machine Co., Cincinnati
Independent Pneumatic Tool Co., Chicago
Keystone Lubricating Co., Philadelphia
Louisville Elec. Mfg. Co., Louisville, Ky.
McGonegal Mfg. Co., E. Rutherford, N. J.
Mall Tool Co., Chicago
Millers Falls Co., Greenfield, Mass.
Milwaukee Elec. Tool Corp., Milwaukee
Rotor Tool Co., Cleveland
Signal Elec. Mfg. Co., Menominee, Mich.
* Skilsaw, Inc., Chicago
Standard Elec. Tool Co., Cincinnati
Stanley Electrical Tool Div., The Stanley Works, New Britain, Conn.
Syntron Co., Homer City, Pa.
U. S. Electrical Tool Co., Cincinnati
* Van Dorn Elec. Tool Co., Towson, Md.
* Walker-Turner Co., Plainfield, N. J.
Wodack Electric Tool Corp., Chicago

TOOLS, Portable Pneumatic
* Acme Tool Co., N. Y. C.
Chambersburg Engrg. Co., Chambersburg, Pa.
Chicago Pneumatic Tool Co., N. Y. C.
Cleveland Pneu. Tool Co., Cleveland
Independent Pneumatic Tool Co., Chicago
Ingersoll-Rand Co., N. Y. C.
Keller, Inc,, William H., Grand Haven, Mich.

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TOOLS, Portable Pneumatic (Cont.)
M-B Products, Detroit
Monnier Bros., Inc., Algonac, Mich.
* Onsrud Machine Works, Inc., Chicago
Rotor Tool Co., Cleveland
Schramm, Inc., West Chester, Pa.
* Sheldon Machine Co., Chicago
Standard Electrical Tool Co., Cincinnati

TOOLS, Stellite
* Haynes Stellite Co., N. Y. C.

TORCHES, Gas-Cutting & Welding
Air Reduction Sales Co., N. Y. C.
Bastian-Blessing Co., Chicago
Linde Air Products Co., N. Y. C.
National Cylinder Gas Co., Chicago

TRAILERS, Factory, Warehouse, etc.
Allis-Chalmers Mfg. Co., Milwaukee
All Steel Welded Truck Corp., Rockford, Ill.
American Car & Foundry Co., N. Y. C.
Baker-Raulang Co., Cleveland
Clark Equip. Co., Battle Creek, Mich.
Crescent Truck Co., Lebanon, Pa.
Easton Car & Const. Co., Easton, Pa.
Elwell-Parker Elec. Co., Cleveland
Lansing Co., Lansing, Mich.
Lewis-Shepard Sales Co., Watertown, Mass.
Mercury Mfg. Co., Chicago
Service Caster & Truck Co., Albion, Mich.
Yale & Towne Mfg. Co., Philadelphia

TRANSMISSIONS, Hydraulic
American Engrg. Co., Philadelphia
* Barnes Co., W. F. & John, Rockford, Ill.
Elmes Engrg. Wks., Chas. F., Chicago
* Ex-Cell-O Corp., Detroit
Hydro-Power Systems, Inc., Pittsburgh
* Oilgear Co., Milwaukee
* Sundstrand Mach. Tool Co., Rockford, Ill.
* Vickers, Inc., Detroit

TRANSMISSIONS, Mech. Variable-Speed
Allis-Chalmers Mfg. Co., Milwaukee
Berkeley Equipment Co., Corry, Pa.
Boston Gear Works, Inc., N. Quincy, Mass.
Briggs & Stratton Corp., Milwaukee
Columbia Vari-Speed Co., Wheaton, Ill.
* Continental Machines, Inc., Minneapolis
* Cullman Wheel Co., Chicago
Dodge Mfg. Corp., Mishawaka, Ind.
* Earle Gear & Machine Co., Philadelphia
Foote Gear Wks., Inc., Cicero, Ill.
* Ganschow Gear Co., Chicago
Ideal Commutator Dresser Co., Sycamore, Ill.
Lenney Machine & Mfg. Co., Warren, O.
Lewellen Mfg. Co., Columbus, Ind.
Lima Armature Works, Lima, O.
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Morse Chain Co., Ithaca, N. Y.
Palmer-Bee, Inc., Detroit
Pittsburgh Gear & Mach. Co., Pittsburgh
Reeves Pulley Co., Columbus, Ind.
* Smith Power Transmission Co., Cleveland
Speedmaster Co., Minneapolis
Stephens-Adamson Mfg. Co., Aurora, Ill.
Sterling Elec. Motors, Inc., Los Angeles
U. S. Elec. Motors, Inc., Los Angeles
Western Mfg. Co., Detroit
* Westinghouse Elec. & Mfg. Co., E. Pittsburgh

TROLLEYS, TRACKS & TRAMWAYS, Overhead
American MonoRail Co., Cleveland
* American Steel & Wire Co., Cleveland
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Broderick & Bascom Rope Co., St. Louis
Chain Belt Co., Milwaukee
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.
Cleveland Crane & Engineering Co., Wickliffe, O.
Coffing Hoist Co., Danville, Ill.
Conco Engrg. Works, Mendota, Ill.
Cullen-Friestedt Co., Chicago
Curtis Pneu. Machinery Co., St. Louis
Euclid Crane & Hoist Co., Euclid, O.
Ford Chain Block Div. Am. Chain & Cable Co., Inc., Philadelphia, Pa.
Harnischfeger Corp., Wilwaukee
Harrington Co., Philadelphia
Jeffrey Mfg. Co., Columbus, O.
Leschen, & Sons Rope Co., A., St. Louis
Link-Belt Co., Caldwell-Moore Plant, Chicago
Louden Machinery Co., Fairfield, Ia.
Mathews Conveyor Co., Ellwood City, Pa.
Palmer-Bee Co., Detroit
Philadelphia Tramrail Co., Philadelphia
Reading Chain & Block Corp., Reading, Pa.
Robbins & Myers, Inc., Hoist & Crane Div., Sprinffield, O.
* Round & Son, David, Cleveland
Shaw-Box Crane & Hoist Div., Muskegon, Mich.
Stanley Works, New Britain, Conn.
Union Mfg. Co., New Britain, Conn.
* Wright Mfg. Div., Am. Chain & Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., Philadelphia

TRUCKS & TRACTORS, Gas & Electric
Allis Chalmers Mfg. Co., Milwaukee
* Automatic Transportation Co., Chicago
Baker-Raulang Co., Cleveland
Barrett-Cravens Co., Chicago
Canton Fdry. & Mach. Co., Cleveland
Caterpillar Tractor Co., Peoria, Ill.
Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.
Crescent Truck Co., Lebanon, Pa.
Easton Car & Const. Co., Easton, Pa.
Elwell-Parker Electric Co., Cleveland
Lansing Co., Lansing, Mich.
Lewis-Shepard Sales Corp., Watertown, Mass.
Mercury Mfg. Co., Chicago
* Round & Son, David, Cleveland
Savage Co., W. J., Knoxville, Tenn.
Towmotor Co., Cleveland
Wright-Hibbard Industrial Truck Co., Phelps, N. Y.
Yale & Towne Mfg. Co., Philadelphia

TRUCKS, Hand
All Steel Welded Truck Corp., Rockford, Ill.
Automatic Transportation Co., Chicago
Baker-Raulang Co., Cleveland
Barrett-Cravens Co., Chicago
Easton Car & Construction Co., Easton Pa.
Fairbanks Co., N. Y. C.
Lewis-Shepard Sales Corp., Watertown, Mass.
Lyon Iron Works, Greene, N. Y.
Metzgar Co., Grand Rapids, Mich.
Morse Mfg. Co., Syracuse, N. Y.
Palmer-Bee Co., Detroit
Sabin Machine Co., Cleveland
Service Caster & Truck Co., Albion, Mich.
* Standard Pressed Steel Co., Jenkintown, Pa.
Union Metal Mfg. Co., Canton, O.
Yale & Towne Mfg. Co., Philadelphia

TUBE COUPLINGS
Dole Valve Co., Chicago
Graf Co., L. V., Detroit
Parker Appliance Co., Cleveland

TUBING, Steel
* Bissett Steel Co., Cleveland

TURNBUCKLES
Bethlehem Steel Co., Bethlehem, Pa.
* Carnegie-Illinois Steel Corp. (Subsidiary U. S. Steel Corp.), Pittsburgh
* Republic Steel Corp., Cleveland

TURRETS, Tool-post & Tailstock
Atlas Press Co., Kalamazoo, Mich.
Colwell, S. G., Providence, R. I.
* Gisholt Machine Co., Madison, Wis.
* Jefferson Machine Tool Co., Cincinnati
* McCrosky Tool Corp., Meadville, Pa.
Specialties Mfg. Co., Inc., Bloomfield, N. J.
Stark Tool Co., Waltham, Mass.

UNITS, Drilling, Reaming & Tapping
* Barnes Co., W. F. & John, Rockford, Ill.
Enterprise Machine Parts Corp., Detroit
* Kingsbury Machine Tool Corp., Keene, N. H.

UPSETTERS (See Forging Machines)

USED MACHINERY (See Classified Index, Searchlight Section)

V BELT Lacings
Shippert Mfg. Co., Dixon, Ill.

V BLOCKS (See Blocks, V)

VALVES, Air-Control
Ace Valve Co., N. Y. C.
Anker-Holth Mfg. Co., Port Huron, Mich.
Atkins & Co., E. C., Indianapolis
* Barber-Colman Co., Rockford, Ill.
Binks Mfg. Co., Chicago
Bristol Co., Waterbury, Conn.
Crane Co., Chicago
Curtis Pneu. Machinery Co., St. Louis
Dole Valve Co., Chicago
Foxboro Co., Foxboro, Mass.
Hanna Engrg. Works, Chicago
Homestead Valve Mfg. Co., Corapolis, Pa.
Hannifin Mfg. Co., Chicago
Hunt & Son, C. B., Salem, O.
Imperial Brass Mfg. Co., Chicago
Jenkins Bros., N. Y. C.
* Littell Machine Co., F. J., Chicago
Logansport Machine, Inc., Logansport, Ind.
Lukenheimer Co., Cincinnati
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Norgren Co., C. A., Denver, Colo.
Northern Engrg. Works, Detroit
Ohio Brass Co., Mansfield, O.
* Ross Operating Valve Co., Detroit
Schrader's Son, A., Div. of Scovill Mfg. Co., Brooklyn, N. Y.
Skinner Chuck Co., New Britain, Conn.
Stewart-Warner Corp., Chicago
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Cos., Rochester, N. Y.
* Tomkins-Johnson Co., Jackson, Mich.
Trane Co., La Crosse, Wis.

VALVES, Hydraulic
Albright Equipment Co., Pittsburgh
* Baldwin-Southwark Corp., Philadelphia
* Barnes Co., W. F. & John, Rockford, Ill.
Blackhawk Mfg. Co., Milwaukee
Chapman Valve Mfg. Co., Indian Orchard, Mass.
Crane Co., Chicago
Elmes Engrg. Wks., Chas. F., Chicago
Galland-Henning Mfg. Co., Milwaukee, Wis.
Homestead Valve Mfg. Co., Corapolis, Pa.
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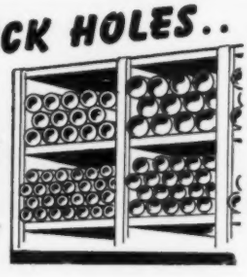

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* Oilgear Co., Milwaukee
Pittsburgh Valve Fdry. & Construction Co., Pittsburgh, Pa.
* Racine Tool & Machine Co., Racine, Wis.
Robertson Co., John, Brooklyn, N. Y.
* Sundstrand Mach. Tool Co., Rockford, Ill.
Trane Co., La Crosse, Wis.
* Vickers, Inc., Detroit
* Watson-Stillman Co., Roselle, N. J.

VISES, Air-Operated
Anker Holth Mfg. Co., Port Huron, Mich.
Champion Blower & Forge Co., Lancaster, Pa.
Hannifin Mfg. Co., Chicago
Knu-Vise Products Co., Inc., Detroit
Logansport Machine Inc., Logansport, Ind.
* Ross Operating Valve Co., Detroit
Skinner Chuck Co., New Britain, Conn.
* Tomkins-Johnson Co., Jackson, Mich.

VISES, Machine
* Acme Tool Co., N. Y. C.
* Armstrong-Blum Mfg. Co., Chicago
* Armstrong Bros. Tool Co., Chicago
Athol Machine & Foundry Co., Athol, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
Cardinal Machine Co., Inc., Glendale, Calif.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Tool & Engrg. Co., Chicago
Chicago Wheel & Mfg. Co., Chicago
* Cincinnati Milling Machine Co., Cincinnati
* Cincinnati Planer Co., Oakley, Cincinnati
* Cincinnati Shaper Co., Cincinnati
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Columbian Vise Mfg. Co., Cleveland
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Gould & Eberhardt, Irvington, N. J.
* Graham Mfg. Co., Providence, R. I.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hannifin Mfg. Co., Chicago
* Hartford Special Machinery Co., Hartford, Conn.
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Heuser Mfg. Co., Chicago
* Johnson Tool Co., E. Providence, R. I.
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* Knight Mach. Co., W. B., St. Louis
Knu-Vise Products Co., Detroit
* L-W Chuck Co., Toledo, O.
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Miller & Crowingshield, Greenfield, Mass.
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Mohr Lino-Saw Co., Chicago
North Bros. Mfg. Co., Philadelphia
Plunket Machine Co., J. E., Chicago, Ill.
* Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Procunier Safety Chuck Co., Chicago
* Producto Machine Co., Bridgeport, Conn.
Reed Mfg. Co., Erie, Pa.
Richards Co., J. A., Kalamazoo, Mich.
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* Sellew Machine Tool Co., Pawtucket, R. I.
* Sheldon Machine Co., Chicago, Ill.
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Wesson Co., Detroit
* Williams & Co., J. H., N. Y. C.
Yost Mfg. Co., Meadville, Pa.
Zernickow Co., O., N. Y. C.

VISES, Machinists' Bench
Athol Mach. & Fdry. Co., Athol, Mass.
* Brown & Sharpe Mfg. Co., Providence, R. I.
* Cincinnati Milling Machine Co., Cincinnati
Columbian Vise Mfg. Co., Cleveland
* Desmond-Stephan Mfg. Co., Urbana, O.
* Fenn Mfg. Co., Hartford, Conn.
* Fray Machine Tool Co., Glendale, Calif.
Hollands Mfg. Co., Erie, Pa.
* New Britain Gridley Machine Co., New Britain Conn. (Stands)
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Parker Co., Charles, Meriden, Conn.
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Wesson Co., Detroit
Western Tool & Mfg. Co., Springfield, O.
* Wiedemann Machine Co., Philadelphia
Yost Mfg. Co., Meadville, Pa.

VISES, Pipe
Armstrong Mfg. Co., Bridgeport, Conn.
* Armstrong Bros. Tool Co., Chicago
Billings & Spencer, Hartford, Conn.
Crane Co., Chicago
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Grinnell Co., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
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Parker Co., Charles, Meriden, Conn.
Toledo Pipe Threading Machine Co., Toledo, O.
* Williams & Co., J. H., N. Y. C.
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American Nut & Bolt Fastener Co., Pittsburgh
Beall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, O.
Eaton Mfg. Co., Massillon, O.
Kantlink Spring Washer Mfrs., Chicago
National Lock Washer Co., Newark, N. J.
Palnut Co., Irvington, N. J.
Philadelphia Steel & Wire Corp., Germantown, Philadelphia
Positive Lock Washer Co., Newark, N. J.
Shakeproof Lock Washer Co., Chicago
Wrought Washer Mfg. Co., Milwaukee

WASHFOUNTAINS, Shop
Bradley Washfountain Co., Milwaukee

WASHING & DRYING, Machines (See METAL-CLEANING EQUIPMENT)

WELDERS, Arc
Air Reduction Sales Co., N. Y. C.
Allis-Chalmers Mfg. Co., Milwaukee
Bear Mfg. Co., Rock Island, Ill.
Comet Products Co., Chappaqua, N. Y.
Commonwealth Mfg. Corp., Cincinnati
Eisler Engrg Co., Newark, N. J.
Ergolyte Mfg. Co., Phila., Pa.
Federal Mach. & Welder Co., Warren, O.
* General Electric Co., Schenectady, N. Y.
Giant Grip Mfg. Co., Oshkosh, Wis.
Hampton Electric Tool Co., Pittsburgh
Harnischfeger Corp., Milwaukee
* Hobart Bros. Co., Troy, O.
Lee & Son, Inc., K. O., Aberdeen, S. D.
* Lincoln Electric Co., Cleveland
Marquette Mfg. Co., Minneapolis
Miller Electric Mfg. Co., Appleton, Mass.
Ohio Brass Co., Mansfield, O.
Owen-Dyneto Corp., Syracuse, N. Y.
Owen Elec. Mfg. Co., Fayetteville, N. C.
Pier Equipment Mfg. Co., Benton Harbor, Mich.
Roth Welding Engrg. Co., Detroit
Taylor-Winfield Co., Warren, O.
Una Welding Co., Cleveland
* Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.
Wilson Welder & Metals Co., N. Y. C.

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Eisler Engrg. Co., Newark, N. J.
Federal Mach. & Welder Co., Warren, O.
Grob Bros., Grafton, Wis.
Laidlaw, Inc., Wm., Belmont, N. Y.
Martin Electric Co., Detroit
* Ohio Machine Tool Co., Kenton, O.
Taylor Hall Welding Corp., Worcester, Mass.
Taylor-Winfield Corp., Warren, O.
Thomson-Gibb Electric Welding Co., Lynn, Mass.

WELDERS, Flash
Federal Mach. & Welder Co., Warren, O.
Martin Electric Co., Detroit
Mesta Machine Co., Pittsburgh
* Ohio Machine Tool Co., Kenton, O.
Swift Electric Welder Co., Detroit
Taylor Hall Welding Corp., Worcester, Mass.
Taylor-Winfield Corp., Warren, O.
Thomson-Gibb Electric Welding Co., Lynn, Mass.

WELDERS, Gun
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Nelson, Ted, Vallejo, Calif.
Progressive Welder Co., Detroit
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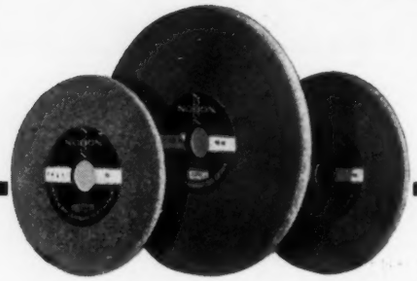

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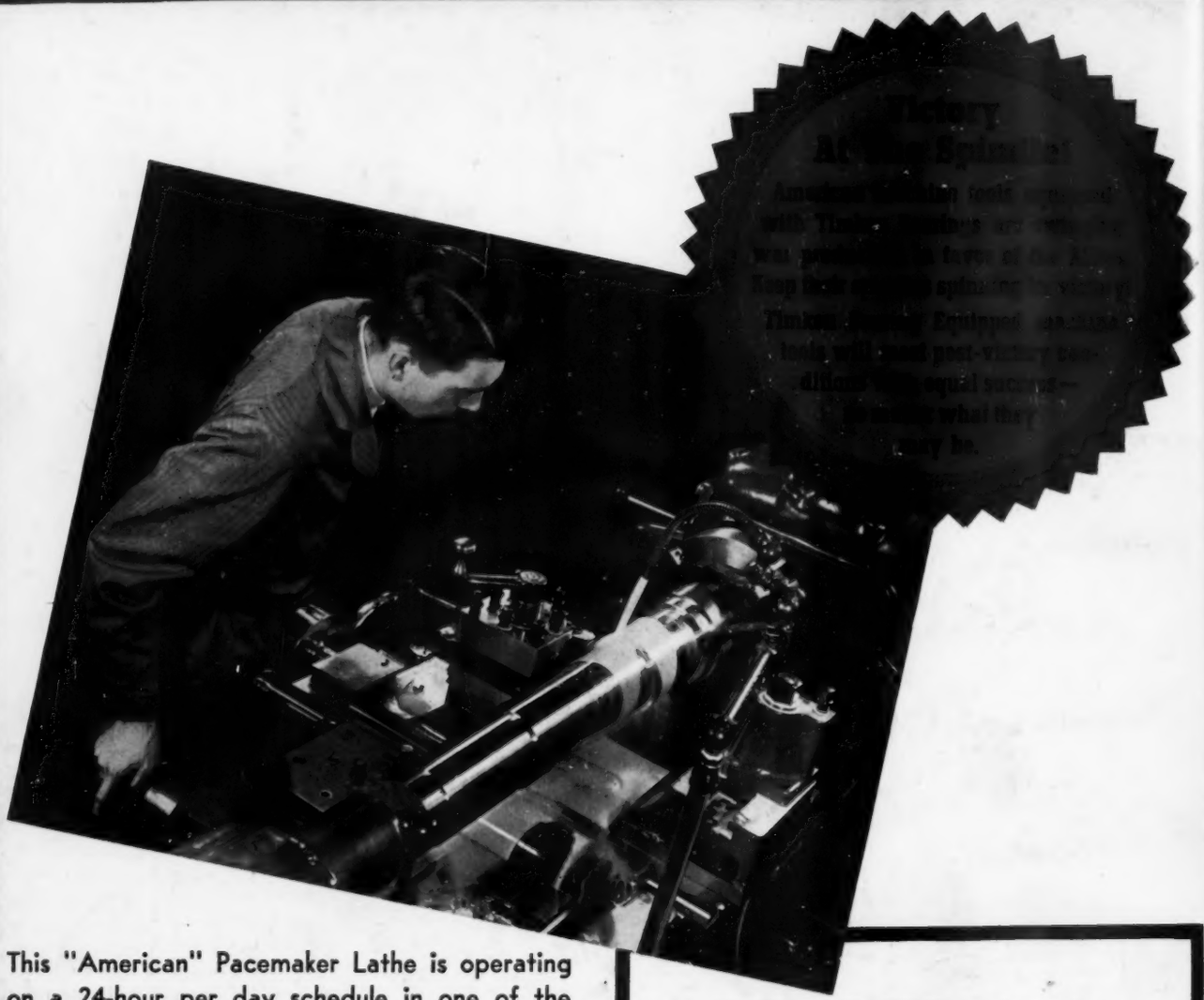

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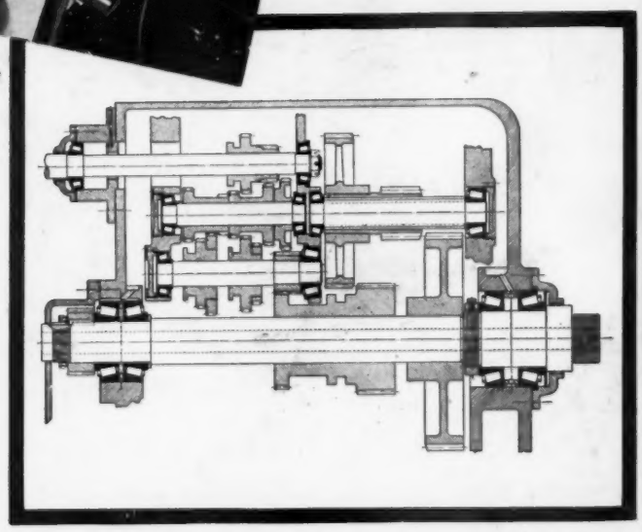
TAPERED ROLLER BEARINGS

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.



The spindle of the "American" Pacemaker Lathe is mounted on Timken Bearings. That means maximum rigidity—freedom from "chatter"; precision maintained constantly under all speeds and cutting loads. A typical application of Timken Bearings to a lathe spindle is shown above.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO